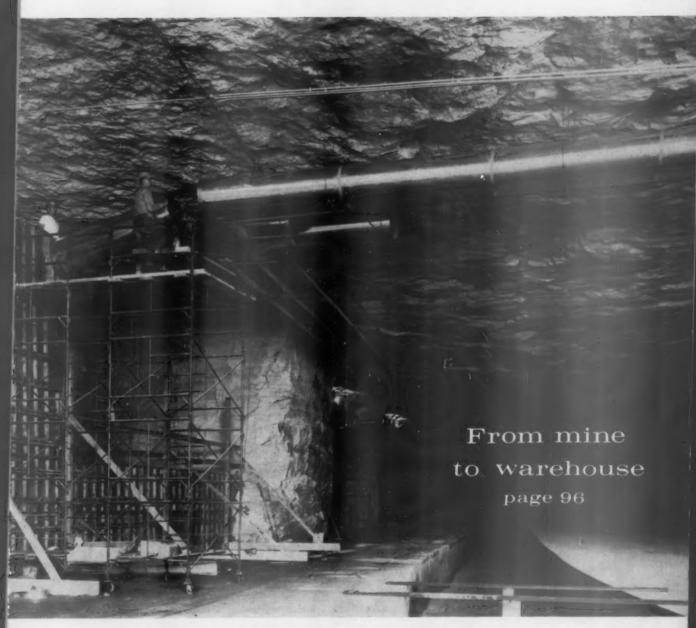
JULY - 1961

PRODUCTS



Where does the Highway Program stand today?

Surge piles displace stockpiles page 82

Higher output on FINE GRINDING .. 20 to 400 mesh... with WILLIAMS ROLLER MILLS

A Williams does the entire job in a single continuous operationfrom feed through grinding, blending, drying and classifying!

- Centrifugal grinding roll action against bull ring keeps production high-automatically compensates for wear
- Positive-flow feed control is self-adjusting-maintains maximum capacity of mill
- Instant external fineness adjustment can be made while mill is in motion
- V Continual upward air sweep to classifier prevents clogging build-up of finely ground material. Mill operates under vacuum to insure dustless operation.
- Automatically controlled hot air is available for drying and increased output of moist material.

These, plus many other advanced features keep Williams Roller Mills far ahead in higher production, lower costs. less downtime and maintenance. Write for catalog.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.

800 St. Louis Ave. . St. Louis 6, Mo.

Oldest and largest manufacturers of hammer mills in the world

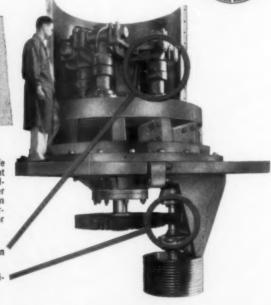


From here, material pulverized by rollers against bull ring are airlifted to classifier which passes correctly sized coarse material for regrinding.

Exclusive! Only Williams has longer-life SPUR GEAR or GEARLESS DRIVES that eliminate expensive bevel and other hard-to-maintain gears. Standard and larger models have rugged spur gear and pinion drive-smaller models have direct motorto-shaft V-belt drive requiring no care or lubrication.

"Giant" mill with cover section off show roller journals which suspend grinding rolls on bearings sealed against dirt and grit. Note wear-resistant steel forged bull ring.

Housing is also removed to show rugged spur gear and pinion drive. Easy, quick accessibility for service is another Williams time and money-saving feature.











Vibrating

Screens





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Mills

Helix-Seal Mills

Separators

Feeders

Impactors



Here's
another of the
invisible extras that
insure the precision performance
of LINK-BELT roller chain



prestressing of multiple-strand chain guarantees

uniform load distribution

Unless each strand carries its full share of the load, multiple-strand roller chain may fail. That's why Link-Belt's prestressing is so vital. Prestressing seats and cold-works the chain joint parts . . . assures equal load distribution across the chain, reduced elongation in service.

Prestressing is just one of many invisible extras that contribute to the greater strength and endurance of Link-Belt roller chain. Others include precise heat-treat control, pitch-hole



Quadruple-strand Link-Belt roller chain drives are used on this two-speed transmission. High speeds on short centers are easily handled. preparation, shot-peening and burnishing of rollers. These features—plus painstaking precision and inspection in every step of manufacture—assure you of chain that can easily cope with today's heavy loads and high speeds.

For engineering assistance in applying industry's preferred roller chain, contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under chains in the yellow pages of your local telephone directory.

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ROLLER CHAINS AND SPROCKETS

ROCK PRODUCTS, July, 1961

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- Instant external fineness adjustment can be made while mill is in motion
- Continual upward air sweep to classifier prevents clogging build-up of finely ground material. Mill operates under vacuum to insure dustless operation.
- Automatically controlled hot air is available for drying and increased output of moist material.

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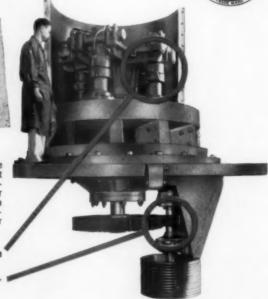


From here, material pulverized by rollers against bull ring are airlifted to classifier which passes correctly sized product and returns coarse material for regrinding.

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"Giant" mill with cover section off show roller journals which suspend grinding rolls on bearings sealed against dirt and grit. Note wear-resistant steel forged bull ring.

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Air Separators Vibrating Screens Feeders

Impactors



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July 1961

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ROCK PRODUCTS magazine is published mouthly by Maclean-Hunter Publishing Co.p., 79 W. Monroe St., Chicago 3, Ill.; P. D. Allen, President. Copyright, 1961, by Maclean-Hunter Publishing Corp. Second-class postage paid at Chicago, Ill. and a: Long Prairie, Minn. Subscription Information—Subscription price; United States and possessions, Canada, one year, 8,3.00; two years, 8,6.00; three years, 85.00; Lyc., single copy, 50c. Pan-American, one year, 8,0.00; two years, 8,14.00; three years, 85.00; Lyc., single copy, 50c. Pan-American, one year, 80.00; two years, 814.00; two years, 84.00; two years, 84.00; two years, 85.00; Lyc., single copy, 81.00. Canadian subscriptions and remittance may be sent in Canadian funds to Rock Proporty, P.O. Box 100. Terminal "A,1" Toronto, Canadian Toronto, Canada. To subscriptor: Date on wrapper indicate sizes with which your subscription expires. In writing to have address changed, give old as well as new address. Rock Proporty is indexel regularly by Engineering Index, Inc. and Industrial Arts Index.



Battered bricks sent back for another beating

Battered, dog-eared bricks—not perfect enough for firing—ride that conveyor belt back to a pug mill for reworking. Though the load isn't heavy, belts were lasting only a year. Oil mixed in with the clay would soak into the belt, blister the rubber, rot the fabric.

When a B.F.Goodrich distributor heard of the problem, he asked the brick company to try a new lightweight belt, called Highseal, which BFG has developed originally for handling oily, greasy food products.

A special rubber compound gives this belt good resistance to oil, grease, moisture. The belt cover is tough, resists abrasion, cracking, peeling—never gets soft or sticky.

At last report, the B.F.Goodrich Highseal belt had been in service 5½ years, had saved the brick company the cost of at least four replacements.

If you would like to know more about this oil-resisting conveyor belt, check with your B.F.Goodrich distributor. He has full details. And, as a factory-trained specialist in rubber products, he can answer your questions about any of the products B.F. Goodrich makes for industry. B.F. Goodrich Industrial Products Co., Dept. M-142, Akron 18, Ohio.



CONVEYOR BELTS

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HOW FAR ... AND HOW FAST ...

can you use computer control profitably?



BAILEY 700 SYSTEMS CAN HELP YOU DETERMINE THIS — ONE STEP AT A TIME

Can computer control be used—profitably—in your process operations?

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Bailey engineers can help you determine and prove — one step at a time — how far analog or digital systems can be profitably applied in your operations. Bailey is equipped, by broad experience, to provide single-source responsibility from sensing and measuring instrumentation to complete automation. Bailey 700 Systems are installed, in operation, or on order, at locations from coast to coast and throughout the world.

Find out what this Bailey background can offer. Contact your Bailey District Office.

SIX STEPS TO FULL AUTOMATION

Centralize and simplify information display—use analog and digital techniques to clarify information, aid operator understanding, improve reliability of interpretation, and save space.

Extend use of interlocks and limiting circuitry use digital solid-state components to extend supervisory controls, thereby minimizing effects of human error.

Increase use of automatic sub-loops—simplify and standardize the starting, controlling, and stopping of major plant components and sub-systems.

Extend on-line controls—integrate sub-loops, interlocks, and limiting controls with conventional controls to secure automatic operation over full range, once unit is on the line.

Provide performance monitoring—add computing facilities to provide significant up-to-date calculations for operation improvement and maintenance scheduling.

Integrate all system elements — add start-stop control to provide full automation, the ultimate goal.

C 158-1

CEMENT DIVISION

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NORTHWESTS GREEN QUARRIES

HERE are three, big Missouri pits, all Northwest equipped—and more than that —they are all repeat order buyers.

Look 'em over-Green Quarries at the top-a Model 6, their fourth Northwest at Carrollton, Mo. Gordon Brothers Quarry next, at Forest City-a Model 41, their seventh Northwest. Below, Trager Quarries at Chillicothe—a 41—their seventh Northwest opens up a new bed of limestone by stripping 25 ft. of overburden.

Rock is the business of these companies. They must have the best in these days of vigorous competition. Repeat orders backed by years of experience from not just one but these several successful producers are a testimonial worth considering, when you are planning your next shovel purchase.

Take a tip from these rock producers and get the full story from a Northwest man.

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TRAGER

QUARRIES

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CRANES

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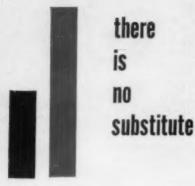
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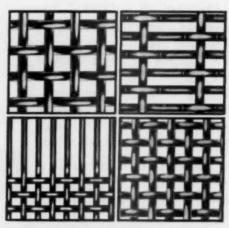
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ROCK PRODUCTS, July, 1961



Why this 1933 first welded kiln could be the key to your company's profits in the 60's

For the simple well-proved reason that they're better, kilns of all-welded construction are pretty much "standard" today. Important to keep in mind: the standard was set by Traylor... builder of the first welded kiln in 1933.

A radical innovation a generation ago—but why so important now? First and obviously, it means that Traylor has the longest record of experience in this

special kind of equipment.

More important still: It's merely one example of Traylor's coming up first with new ideas to meet changing needs. Benefits of other Traylor "firsts"—some dating before 1933, many since—are being reaped today throughout the industry, quite likely already including your own plant. Traylor built, for example, the first 60-inch primary gyratory crusher and the first large ball mill.

Today Traylor's proved capacity to pioneer sound innovations in kilns, mills and crushers is enhanced by expanded research capabilities and process know-how.

Up-to-date facilities and a long, impressive record of past "firsts" are a good combination of reasons to call on Traylor first when you're planning for efficient operation in the changing business climate of the sixties.



TRAYLOR ENGINEERING & MANUFACTURING

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ROCK PRODUCTS, July, 1961





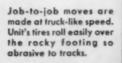
Michigan's primary job: cleaning around two 6-yd shovels, usually spotted 1,500 to 1,800 ft apart.



Typical Michigan odd-job: centrally stockpiling oversize rock chunks for secondary breakage.



To clean and pile average 40,000 ton blast takes the high-speed 56,000 lb Michigan only half a day.





One 262 hp Michigan Dozer does work of two big crawlers: cleans around two 6-yd rock shovels, also piles blast rock at Huron Portland Cement Company quarry.

A typical saving:

60% CUT IN SHOVEL CLEANUP TIME



At least three important savings have been realized by the Huron Portland Cement Company quarry, Alpena, Michigan, since their 262 hp Michigan Tractor Dozer took over pit maintenance duties.

ONE, the Model 280 Michigan Tractor Dozer and its one operator do the work of two 28,000 lb class crawlers and two operators.

TWO, Michigan tires have eliminated annual or bi-annual track rebuilding. Tires on the Model 280 are expected to last "about twice, maybe three times as long as tracks," say men on the job...an estimate based on the quarry's three-year experience with a smaller (162 hp) Model 180 Michigan Dozer, recently moved from the quarry to the company cement plant.

THREE, the Michigan, with its high speed and power, saves time on almost every individual cleanup chore. To be sure, this saving may be only 2 to 5 minutes per job . . . but added up over 6 days a week, 52 weeks a year, the sum total makes an important contribution in more loads delivered, quarry face to crusher grizzly.

For instance, take the saving in shovel cleanup. Back in Huron Portland's crawler days, a good operator could clean the spillage around one shovel in 5 minutes. While the crawler dozed, the 6 yd electric shovel couldn't load (primarily because its power cable

blocked one side). Today, the shovel still cannot load during cleanup. But the high-speed Michigan does each cleanup in 2 minutes! Thus, 3 minutes are saved. Three minutes saved, 8 to 12 times a day, at each of Huron-Portland's two 6-yd electric shovels. That's 5 to 7 extra 26 to 27 ton truck loads from each shovel each day—260 to 360 extra tons of stone each day for the crusher (and the cement plant).

75% cut in blast cleanup time

Another example of time saved is in blast cleanup. One to four times a week, Huron-Portland's crew shoots the 100 ft high quarry face. Each blast breaks up 35,000 to 45,000 tons of limestone. Trouble is, some rock gets thrown 100 to 200 feet, sometimes 300 ft. Used to take a crawler one to two days to police the area and gather all the rock. Now, the Michigan Tractor Dozer does the policing job in half a day. (Here is one place the 262 hp Michigan Model 280 noticeably outperforms the 162 hp Michigan Model 180 used so successfully for three years. The bigger Model 280 can move heavier rock . . . can often do in two passes what took the Model 180 four passes . . . and it can pile the rock several feet higher.)

Stockpiles oversize rock... biggest chunk moved, 16½ tons

Being the only mobile Dozer in the

450 acre pit means the Michigan does lots of odd jobs too. It moves drilling machines, air compressors, and shanties. It cleans spillage from the 2,000 ft of shovel-crusher haul road. Cleans around the crusher. Drives a mile to the cement plant to stockpile coal, when necessary. Moves power cable for the shovels. In winter, it keeps roads and building areas free of snow. It even moves oversize rock chunks away from shovel for secondary breakage. Biggest rock chunk dozed by the Model 280, to date, measured 4x5x10 ft, weighed about 33,400 lbs.

Late Bulletin!

Since writing this report on Huron Portland Cement's quarry operations we have learned that the veteran Model 180 Michigan mentioned above has been traded for a new 290 bp Model 280. This larger, more-powerful Michigan Tractor Dozer is now working in the quarry—the older 262 bp Model 280 has been assigned coal bandling and general yard jobs.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division



2481 Pipestone Road Benton Harbor 3, Michigan In Canada: Canadian Clark, Ltd., 51, Thomas, Ontaria



B.F.Goodrich helps unlock Ohio River traffic jam

WITH TIRES, HOSE AND OTHER PRODUCTS, B.F.GOODRICH SPEEDS CONSTRUCTION OF NEW NAVIGATION SYSTEM

Time was when traffic was slowed by 4 separate locks in a 95-mile stretch of the Ohio River. But the Capt. Anthony Meldahl Locks and Dam will flood them. This project is part of a modern navigation system that will reduce 13 locks and dams to 3, and lockage time from 191/2 hours to 11/2 hours.

Groves Ventures Company of Minneapolis, Minnesota, a joint venture sponsored by S. J. Groves & Sons Co., is on the job with an army of B.F. Goodrich tires and always-available BFG tire service. Rock Service tires, for example, haul 33-ton loads of concrete from batch plant to lock forms over rock-strewn roads. No problem for these BFG giants, though. They're available in new

33 TONS OF CONCRETE leave batch plant (photo at left) bound for lock pouring area (below). Locks will be 110' x 1200', will require over 670-thousand cubic yards of concrete, will cost over \$25-million. B.F.Goodrich Rock Service and Rock Rib tires haul concrete 16 hours a day, 6 days a week down 2 long grades into the cofferdam excavation. Roads are covered with crushed rock and gravel, and often with 6" of water. Yet BFG tires give exceptional service, Groves Ventures reports.





B.F.GOODRICH ON-THE-JOB TIRE SERVICE keeps Groves Ventures equipment rolling on lock project near Chilo, Ohio—keeps tire costs at a minimum. The BFG Servicemobile and repair shop are manned by tire experts, whose workmanship prompts Project Manager W. J. Green to write, "B.F.Goodrich service and repair facilities have done an excellent job of covering our needs."

NO STING IN THIS STEAM HOSE, used to cure concrete at Capt. Anthony Meldahl locks. It's Burstproof hose, made of BFG-developed heat-resistant rubber with layers of braided wire reinforcement. It can't explode. Supplying Groves Ventures with hose, belting and protective clothing—as well as tires—is all part of the BFG Unified Contractor Program. Contractors benefit from lower costs and better rubber products' service with this new BFG program.

Cut Protected compound that defies tire-killing rock. B.F.Goodrich Flex-Rite Nylon cord construction withstands double the impact of ordinary materials, resists heat blowouts and flex breaks. Result: more retreadable tires. No wonder Groves Ventures specifies BFG tires.

You'll find B.F.Goodrich hose, protective clothing and other products at work here—all part of the BFG Unified Contractor Program that helps contractors cut costs and get better service from rubber products. Call your nearby B.F.Goodrich Smileage dealer (listed under Tires in the Yellow Pages). He has the know-how to help make your next contract more profitable. The B.F.Goodrich Company, Akron 18, Ohio.

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment



SMIDTH GRINDING MILLS



Ball Mills and multi-compartment Unidan Mills for wet and dry, open and closed circuit grinding and airswept Tirax Mills for simultaneous drying and grinding.

Special features include the Smidth slide shoe bearing and the Symetro Drive.



Upper photo: Unidan Mills, Symetra driven, with one slide shoe and one trunnion bearing. Lewer photo: Gear driven Ball Mill.

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WHAT'S HAPPENING

in other fields of interest to the rock products industry

- Acid, air, steam, water and just plain scrubbing proved either too severe or ineffective when removing soft scale from tube heat exchangers in nuclear reactors. So scientists at Union Nuclear Carbide Co. turned to ordinary sand, and found that by pumping an abrasive slurry through the condenser tubes, the scale was gently but thoroughly removed. Tests showed that the coarseness of the sand is important, as it affects the uniformity of suspension in water at any given velocity. Too, the method can be adapted—through varying abrasive particles, mesh size, concentration, slurry velocity and treatment time—to widely differing pipe and tube cleaning jobs.
- Uranium mining by ordinary oil well methods is underway with great success in New Mexico's Ambrosia Lake district. Kermac Nuclear Fuels, Inc., Grants, N. M., has sunk a 90-in. shaft approximately 710 ft. with a rotary oil well rig, and is contemplating a shaft 10 ft. in diameter. Competitive in cost, this method is claimed to be much faster than conventional shaft sinking, taking as little as one-sixth the time. It is safe, too—a most important factor in an industry where fatalities are all too common. When the rotary rig is used, no man enters the shaft until it is ready for operation.
- 100 percent slag concrete, extra strong and fast in setting, is a very likely commercial development. The Ontario Research Foundation, Toronto, has been working with a concrete which uses pulverized slag as the cementing material and varied sizes of slag as aggregates. As well as supplying special needs of the building industry, such a concrete would swallow piles of iron and steel wastes.
- An information center for rock physics and rock mechanics will be established at Colorado School of Mines. Collecting, classifying, and evaluating information about behavior of rock subjected to various physical conditions, it will be operated jointly by the school's Research Foundation, the School of Mines and the Lawrence Radiation Laboratory, University of California.
- A new use for lime turned up in a patent filed by Columbia-Southern Chemicals. Weed growth can be minimized in earthern fresh-water reservoirs and ditches by treating the soil with lime. There is an important plus in addition to prevention of weed growth. Soil is stabilized, so that there is a substantial base on which to walk or drive vehicles if the pond is drained.

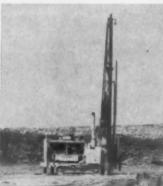
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- From east—west—north—south—orders pour in to National Gypsum Co.'s electronic communications center at Buffalo, N.Y. Housed in a newly-erected addition to the headquarters, the center forms the hub of a 15,000-mile, 82-building communications network. Frequently the complex equipment processes the order so rapidly that the customer receives same-day service. During the coming year, over 750,000 orders and messages will get the lightning treatment.
- Blasting by a new method—with services ranging from preliminary engineering to actual detonation—has joined the list of mining offerings from Dow Chemical Co. Introduced on the Mesabi range, the ammonium nitrate explosive is described as a "metallized system" and is intended to be compounded at the mining site. At the initial demonstration, four 10-in. holes about 45 ft. apart were loaded with 4,000 lb. of the explosive. Some 40,000 tons of well-fragmented hard upper cherty taconite were blasted.
- Atomic submarines, planes and rockets of the future may be able to depend on an invention of Dr. Bernard Agruss, scientist at Allison Div. of General Motors. This liquid metal fuel cell operates on the same principle as a flash-light battery, except for being thermally regenerative. In conjunction with a heat source such as a nuclear reactor the cell, which has no moving parts, should be extremely reliable and efficient. Its makers already predict that liquid fuel cells can be manufactured as much as 10 times smaller than other types with equivalent electrical output.... Domestic use is the goal set up by Illinois Institute of Technology scientists, who are working on a fuel cell to create electricity out of natural gas, water and air. The 2-watt, 6-cell laboratory model has given encouraging results, indicating that further research is more than feasible.
- Grime, moisture, fungi and chemicals scarcely faze electric motor windings when they're encapsulated in epoxy resins. Applied as low-viscosity liquids, these resins change into tough, solid insulation shortly after application. Under severe operating conditions motor life may be extended as much as twelve times. And because new encapsulated motors are only slightly more costly than varnished, open-type motors and much cleaner than totally enclosed, fan-cooled types, they are being eagerly accepted by industry.
- Beauty is specified in highway design in New Zealand, along with economy and efficiency. Engineers are placing emphasis on smooth concrete, color and exposed colored aggregates. In the Wellington District is an example of the trend. The bridge has a duck-egg blue undersurface and off-white facing structures. The handrail is black and red with white lattice work.
- Boiled linseed oil can safeguard streets and highways from ruinous winter weather, magnified by the use of salt in snow removal. According to an item in Consulting Engineer (May 1961, p. 206), it efficiently protects even non-airentrained concrete from deterioration.

FORMULA FOR PROFIT:

3x = 17







In a four-million-ton per year quarry, operated by Solvay Process Division, Allied Chemical Corporation, three Ingersoll-Rand Drillmasters are now doing the same amount of work that previously required eleven churn drills and six wagon drills!

Based on the performance of the first Drillmaster, which drilled about 100,000 feet in the first year of operation, it was apparent that major savings could be made by this advanced drilling method using the revolutionary Ingersoll-Rand DOWNHOLE drill. Two more machines were purchased and the 17 other drills were put on the retirement list. The saving in direct labor was equally impressive, releasing needed manpower for other operations.

For maximum production at lowest overall cost, join the swing to the Drillmaster method. Your Ingersoll-Rand representative will be glad to tell you all about it. Call him today.

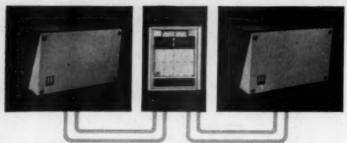




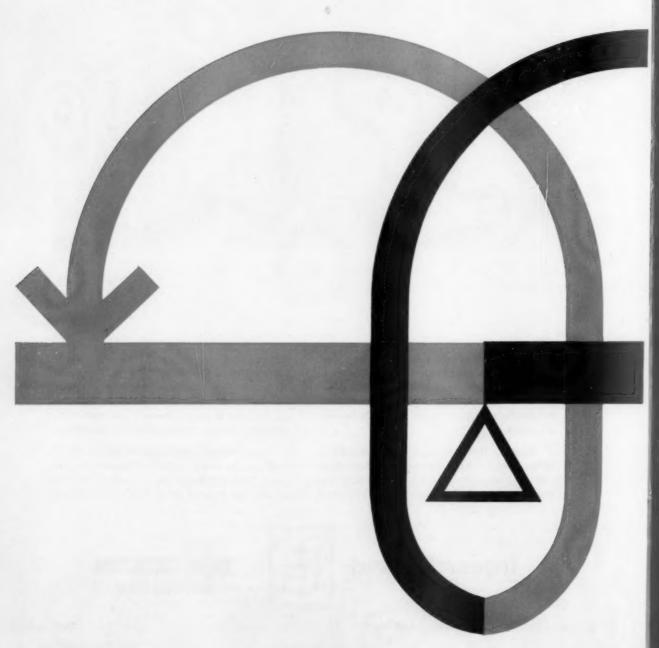


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Care and feedback of delicate inputs



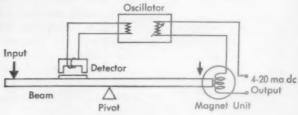
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H First in Control

Delicate inputs thrive on the tender care of *ElectriK Tel-O-Set's force-balance feedback system*. This system, used as the basic circuit in *Tel-O-Set* transmitters, receivers, controllers, and other instruments, has proved itself in thousands of installations in the last five years. The force-balance feedback circuit increases the accuracy and dynamic response of the system by decreasing hysteresis effects and sensitivity to changes in ambient conditions.

Observe: (1) input force (from bellows, Bourdon tube, or displacement linkage) deflects pivoted beam; (2) air-gap in ferrite detector increases, (3) producing a change in inductance in oscillator circuit; (4) a portion of output current is fed back into magnet unit, producing a force on beam which is equal and opposite to input force; feedback balances beam. Full scale motion is only one-thousandth of an inch.

The advanced control engineering seen in force-balance feedback is carried through the entire *Electrik Tel-O-Set* System. Specifically, there's no external power required at any field-mounted *Tel-O-Set* instrument. Line power connection is made only at the receiver. Two-wire d-c transmission eliminates shielding problems. The 4-20 milliamp signal range of the system gives a live zero and permits the use of the most reliable transistors available. The d-c signals



can be fed into data handling systems and millivolt-actuated instruments . . . can be easily transduced to a standard 3-15 psi pneumatic signal to perate existing pneumatic systems.

Take a new look at your control applications with the Electrik Tel-O-Set System in mind! Get complete technical data from your local Honeywell field engineer. Call him today . . . he's as near as your phone. MINNEAPOLIS-HONEYWELL, 21 Penn Street, Fall River, Massachusetts.

Research—best bet for future success

ECONOMISTS AGREE that the best bet for future business success is investment in research and development. They report that, although the plan is not new, its acceptance and application during the 1960's will be stepped up. In fact, this kind of investment is expected to play a vital role in our country's economic progress this decade.

That benefits accrue from industrial research is no longer questioned. A major return is the creation of new markets for products, to fill the needs of an expanding, mobile population.

An article in a recent issue of Challenge magazine reveals that spending for industrial research and development in the U. S. doubled in the 1955-1960 period. It projects for 1970 an expenditure 85 percent higher than now. Another source stated that products not yet on the market will account for as much as one-third the total sales of manufacturing companies by 1970—if the projected spending rate holds.

The rock products industry is in tune with this national trend toward more investment in research. Individual companies and national associations representing every segment of our industry are stepping up their activity in this field. Equipment manufacturers are working both independently and cooperatively with industry in researching for the development of new machinery and processes.

One producing company attributes at least a dozen brand-new commercial products, now enjoying sales in markets the company didn't touch before, to direct results of its probing research program. A national association has hired a top-flight research firm to learn about and study the long-range research programs of virtually all other industries. It wants to find out the possibilities of using its products in industries where they haven't been used before, either in new applications or as substitutes for other materials now being used. Also, results of all-industry research may uncover new future uses for products that presently are unknown.

Improvement of product quality and uniformity, and reduction of production costs are other proved benefits of industrial research. No one can deny the need for work to achieve these requisites for continued business success. This is witnessed in our own industry by the accelerated move toward complete mechanization, full instrumentation and centralized control, and automation.

The handwriting is on the wall. Your success tomorrow depends on research today. It's up to each individual company to support the program to the maximum. Do it yourself, hire it done, support your industry national associations in their work—do it any way you can.



BIGGEST NEWS in wire rope in years!

You owe it to your company to learn about Macwhyte's new 7-FLEX.® But—be prepared to change your thinking about wire rope!

You've never seen another wire rope like 7-FLEX—there is no other like it! It's an all-purpose wire rope, flexible as 8-strand—rugged as 6 x 19—fatigue-resistant like a 6 x 37.

There is 16\%3\% more wearing surface in 7-FLEX than there is in a 6-strand rope. There is less unit pressure between rope and sheaves, so less rope and sheave wear. There is more sheave contact, less rope-creep. Result: longer rope life, less downtime, lower operating costs!

7-FLEX can make important savings on many wirerope applications. Ask any Macwhyte distributor. Free Bulletin 60100-R available upon request. Other Macwhyte products
that serve you profitably



Slings — Safe, easy-to-handle Macwhyte slings for every lifting need are available in round-braided, flat-braided, or Safe-Guard styles. Many standard designs. Also custom-made to your requirements. Send for Bulletins 5308-R and 5886.



Corrosion-Resisting Wire Rope — Many sizes and constructions in Stainless Steel, Monel Metal and plastic or nylon coated. Meet the requirements imposed by alkaline and acid conditions and marine atmospheres, temperatures, and humidity. Send for Bulletin 49-30.



Wire Rope Assemblies — Safe-Lock wire rope assemblies are precision made to your order in the size, length, and strength needed. Uniform high quality with fittings permanently swaged to the rope. Many standard designs. Send for Catalog 6101.



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ROCK PRODUCTS, July, 1961

The newest reason to make 61 FORD **HEAVY DUTIES**

GIVE TWICE THE CAB, FENDER AND RADIATOR LIFE!

Rugged Ford Heavy Duties utilize heavier gauge steel, sturdier reinforcements, and a new independent mounting system to separate cab, fenders and radiator. This stronger construction, with each component individually frame-supported, doubles cab, fender and radiator lifecuts downtime delays and maintenance expense.

CAB-A 25% heavier floor pan and toeboard provide a solid base for greater cab durability. New full-length door pillar reinforcements and stronger inner door panels minimize door sag. New triangular mounts keep cab level and protect it from frame-movement stresses.

FENDERS-Ford fenders are 25% heavier gauge, too. They are bolted to a rubber-cushioned transverse support in front

for needed flexibility. Fender-wide rear brackets provide necessary rigidity. The removal of only 9 bolts permits pulling the fender assembly for easier access to engine.

RADIATOR-New Ford "lock-seam" construction doubles the solder area on key seams, and heavier gauge tank and header walls provide increased radiator strength. "Horse collar" mounting on rubber pads soaks up vibrations and diagonal braces at sides give solid support.

Ford's separate mounting of cab, fenders and radiator frees them from frame-movement stresses that occur when these parts are rigidly attached to each other. Result: failures and service costs are reduced even in tough off-road operation.



SEVEN MORE REASONS WHY IT'S GOOD BUSINESS TO DO BUSINESS WITH FORD!

You save from the start with Ford's traditionally low prices, and your savings continue with low operating and maintenance costs. These facts are documented by certified test reports from America's foremost independent automotive research firm. Ask to see these reports. They're on file at your Ford Dealer's.

In addition to these dollar-and-cents savings, the following bonus benefits are yours with Ford Trucks:

- 1. Rigid quality controls give you the strongest safeguard of truck reliability ever. Modern, exclusive-truck manufacturing facilities, with emphasis on quality every step of the way, are designed to give you a Ford Truck that is as free from defects as a truck can be. Tangible results of these high standards are Ford's new warranties.
- 2. Exclusive 100,000-mile warranty (or 24 months) on 401-, 477- and 534-cu. in. Super Duty V-8's is the most liberal in the industry. Each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. The warranty covers full cost of replacement parts... full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.
- 3. 12,000-mile warranty (or 12 months) on all 1961 Ford Trucks of every size is further evidence of the confidence

- Ford has in its quality controls. Each part, except tires and tubes, is now warranted by your dealer against defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.
- 4. Special fleet financing can be arranged by your Ford Dealer. It's available for owners of two or more trucks, and provides the opportunity to precisely tailor payments to your income patterns or depreciation schedules. This fleet-fitted financing offers substantial savings and frees your working capital.
- **5.** Sales engineers and service specialists in 36 district offices are on call to solve special truck problems. Working with both dealers and customers, these experienced truck men represent another extra step Ford takes to provide your continued satisfaction.
- **6.** Replacement parts depots at 26 strategic locations across the country quickly supply needed parts from ample stocks. Ford's entire supply system is geared to give you faster service and reduce costly downtime . . . wherever you are.
- 7. 6,800 Ford Dealers, including 280 specialized Heavy Duty truck dealers, can keep your trucks ready to go wherever they go. From coast to coast, fast Ford service—gas and Diesel—is always close at hand.

From Super Economy pickups to Diesel-powered tractors, you can now fill every truck need up to 76,800 pounds GCW with a modern, money-saving Ford Truck.

Quality-Built...Maintenance-Engineered

FORD TRUCKS COST LESS

FORD DIVISION. Strictly dev Bernpany.

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ROCKY'S NOTES

by Nathan C. Rockwood

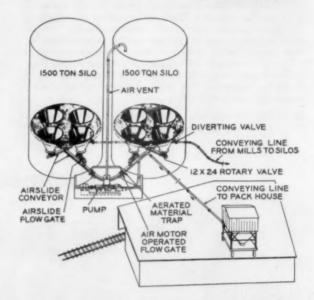


More about nonuniformity in cements

Some six years ago, when the ready-mixed concrete industry commenced "to feel its oats," several large producers started complaining about variations in the qualities of portland cement that they had to use. Of course, it had long been appreciated that cements from various sources (or made from slightly different raw materials) were necessarily a little different in spite of their meeting standard specifications. These differences were not important for most construction and were never taken very seriously except on some public works, where engineers tried to eliminate such differences with special specifications and, in some instances, by special provisions for blending the shipments.

That there could be significant differences in the strength-producing properties of portland cement shipped from the same mill, from day to day or week to week, was not generally known or appreciated by the concrete manufacturer until 1958, when the results of research work by the National Ready Mixed Concrete Association were published. Although this report was probably anything but welcomed by the portland cement industry, it was awarded the Sanford E. Thompson prize of the American Society for Testing Materials for "outstanding merit in the field of concrete and concrete aggregates."

Since then, we know that this paper has received much attention in the cement industry; and, undoubtedly, conscientious cement manufacturers have tried to meet the problem. Apparently they have not, as a whole, succeeded any too well—for the National Ready Mixed Concrete Association renewed its research in 1959. A summary of all this research to date was presented in a report to the Association at its recent annual convention.* The new investigations included samples of cement from 14 sources. The original investigation was of only five sources. Some of the original five were retested after they had been stored in sealed containers.



Blending five grades of talc at Gouverneur Talc Co. (Drawing, courtesy of Mining Engineering, March 1961)

The report states: "In the first investigation 30 percent of the shipments from the mill [with the most variable cement] would be expected to differ from the average strength by 500 psi. or more. In the second investigation, the coefficient of variation of the most variable cement would indicate 40 percent of the shipments differing by this amount. The most uniform cement in either series is shown to have about 5 percent of shipments differing from the average by more than 500 psi."

Tested three years later, the samples from the original five sources used for the first investigation led the investigators to the conclusion that such storage, in air-tight containers, had no effect on the strength characteristics, except to give about 10 percent lower strengths across the board. The only relation between strength characteristics

Please turn to page 119

^{*}Studies of Variations in Portland Cement, by Richard D. Gaynor



One of Michael's Fuller-equipped Reo F-505 6 x 6 OM Transit Trucks. The power is transmitted through a Fuller R-35 7-speed ROADRANGER to a 2.55:1/1.00:1 transfer case and 7.59:1 front and 7.54:1 rear axles,

R-35 ROADRANGERS from Pit to Patio

"We have more than doubled our business in the last three years," Vern Michael, owner of Michael Concrete Products, Inc., Loveland, Ohio, says. "Since we bought our first big Fuller-equipped Reo in 1957, our trucks always come through on deliveries. That Fuller R-35 ROADRANGER Transmission should be given a major portion of the credit for this performance. It has the get-up-and-go we need to get thru the rough construction sites where we operate."

Fuller R-35 RoadRanger features:

- No gear splitting 7 selective and progressive gear ratios
- Easier, quicker shifts—closely spaced and equal ratios in the operating range
- One shift lever controls all 7 forward and 1 reverse speeds
- Engines work in peak hp range with greater fuel economy
- Compact transmission—only 375 lbs.,
 26-25/32 inches in length

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H-90B replaces three other machines

"The H-90B will go into the stockpile and get a full load fast, and it's quicker on the dump than other loaders previously used," says Leonard Lewis, Superintendent of A & R Stone Co., Inc., Murfreesboro, Tenn. "Other features of the H-90B that we particularly like are its good all-around performance, the best of traction and load-carry balance, offering maximum operator safety."

This limestone quarry produces nine grades of material, and the 3-yd. H-90B PAYLOADER truck-loads all the production from the nine stockpiles as needed. Previously the load-out team consisted of a 1½-yd. rubber-tired loader and two crawler loaders of 2¼ and 1½-yd. capacities. Of these three, only the 2¼-yd. crawler unit was retained — as a standby.

Aggregate producers, like A & R Stone, find that the H-90B is the "performingest" loader in its class—a powerful, fast-moving and efficient producer that is as tough as it is productive. Like all 4-wheel-drive PAYLOADER units, it has torque-proportioning differentials that discourage wheel spin-out to provide maximum traction and reduced tire wear.

The H-90B also has almost a foot more dumping clearance and more horsepower than the average of competition. It also has more stability and balance because of longer wheelbase and wider tread. In safety, in ease of control, and in protective features to insure long life and low maintenance, it is also without equal in its division. Your Hough Distributor is ready to prove that a PAYLOADER is your best bet in any size.

PATLOADER

HOUGH, PAYLOADER, PAYMOVER, PAYLOGOER, PAYLOMATIC and PAY are registered trademork names of The Fronk G. Hough Co.



H-70B "Loads 10 tons in 11/2 minutes"

"With this Model H-70B my operator can load-out a 10-ton truck in 1½ minutes which we consider very good for a 2-yd. machine. Before we bought it, we had a competitive demonstration and it outproduced a 3-yd. machine of another make," says Harry W. Hespell, V.P. of Montgomery Stone Company, Inc., of Montgomeryville, Pa. "We have had over five years of proven PAYLOADER dependability." His operator says he "especially likes the ease of operation with the abundance of reserve power."

This long-established trap-rock quarry produces roadbase, surfacing and building stone. Its all-electric crushing plant averages about 500 tons per day. The H-70B replaces an older PAYLOADER that Mr. Hespell says "gave us 5 years of proven dependability." It takes a superior combination of power, traction, digging ability and fast cycling speed to get such output from a 2-yard machine handling large, heavy rock. It explains why the H-70B is hard to beat at any job.

It has 4" more dumping clearance than the average of its class, and many other "extras" that make it outstanding in performance, easy servicing and long life: sealed, pressure-controlled hydraulic system; sealed front brakes; "operator's choice" dual brake pedals (a Hough "first"); separate oil-to-air converter oil cooler; torque-proportioning differentials; easy access to engine and other service points.

Whether you need an H-70B, H-90B or a larger or smaller tractor-shovel, you'll get the most for your money from a PAYLOADER Distributor.

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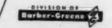


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WASHINGTON LETTER

by Edgar Poe

"Moonlight" Is blamed For jobless

The International Association of Machinists, through its officers, warned all union members that "moonlighting" is

becoming a serious threat to union-won working conditions and is contributing to unemployment. The warning came in an official circular to each of the IAM's 2,163 Local and District Lodges and was published in the union's weekly newspaper, The Machinist. The circular was signed by IAM President Al Hayes and General Secretary-Treasurer Elmer E. Walker.

"It is indeed ironic," the circular declares, that labor's achievement of the 40-hour week—which was designed to spread the work and give all workers an opportunity to enjoy relaxation, education and cultural activities—has made it possible for some workers to take additional employment—to moonlight—at the expense of other workers. Many of these moonlighters earn a fair week's pay at union scale on their regular jobs. This makes it all the more possible for them to work for lower wages on their second—and sometimes even their third job. The problem of moonlighting is serious enough now. When we reach our goal of a 35-hr. week, there is danger that it may become even more serious."

NBS surveys Asphalt roof In high winds

Wind resistance of asphalt shingle roofing, installed by different methods, has been studied by the National Bu-

reau of Standards. This project was sponsored by the Air Force, the Office of the Chief of Engineers of the Army, and the Navy Bureau of Yards and Docks. The important survey covered 54 Army, Navy and Air Force installations, and showed that wind damage to asphalt shingle roofing had occurred at 36 of them or 67 percent. The significance of the wind problem to civilians is emphasized by the fact that asphalt shingles constitute more than 80 percent of the roofing used on sloping roofs in the U. S.

William C. Cullen's investigation consisted principally of an extensive laboratory and field study

of the sealing systems designed to reduce wind damage. There are two general methods of sealing the shingle tab. In one method, a small amount of plastic cement is applied to the underside of each tab during installation. Under the second method, which has come into use more recently, shingles are treated with adhesive (usually asphaltic) at the time of manufacture. The shingles are then known as "self-sealing." The adhesives, placed on the underside of the shingles, seal under the influence of heat, with the exception of one type that depends upon pressure for sealing.

In actual use on buildings, solar heat accomplishes the sealing. After the shingles are in place, absorption of solar energy occurs, the amount of absorption depending on the ambient temperature and the color of the shingles. With an ambient temperature of 90 deg. F., for example, the temperature under the self-sealing shingles where the adhesive is located may be 160 deg. F.

A guide test method for wind resistant shingles, based on results of the study at the Bureau, now has been adopted by the Underwriters' Laboratories, Inc., sponsored by the National Board of Fire Underwriters.

Under the procedure adopted by Underwriters' Laboratories, the shingles being tested are subjected in the laboratory to a temperature of approximately 140 deg. F. (under the shingle) for 16 hr. They are then required to be able to withstand a continuous wind of 60 mph. for 2 hours, in order to secure an acceptable rating.

Depreciation Allowances

Many business firms believe liberalization of tax depreciation allowances would stimu-

late business expansions. The Treasury conducted the survey last summer to determine if they had any proposals for tax reforms. A decisive majority of the 3,000 firms responding to the Treasury questionnaire indicated that liberalized depreciation would materially influence their investment decisions in a manner which would increase their capital expenditures, said a Treasury spokesman.

Please turn page

Washington Letter

continued . . .

U. S. roads and Streets total 3.5 million miles

The Bureau of Public Roads reports that in 1958, U. S. roads and streets, under the jurisdiction of all levels of

government, totaled 3.5 million miles. Compiled from data supplied by the various states, the research showed rural roads comprise slightly more than 3 million miles, or 88 percent of the total. The 416,000 miles of municipal roads and streets account for the remaining 12 percent.

Observed the Bureau: "The road and street systems in the U. S. have grown little in extent in recent years. The nation's needs lie generally not in more mileage but in improvement or replacement of existing highways. As one indication of improvement progress, the mileage of unsurfaced roads and streets has been declining at an average rate of 3 percent during recent years."

President Seeks tax Law changes

A broad tax reform is going to be placed before Congress next year. The proposed changes by President Kennedy, if en-

acted into law, would effect every pocketbook in the country. Some of the changes include repeal of the dividend exclusion and credit. Under present law, stockholders can exclude from taxable income the first \$50 in dividends, which means that a married couple can deduct \$100 in dividends when they pay their Federal income tax.

The withholding tax would be expanded to include stock dividends and interest payments. This would mean that corporations, banks and savings institutions would deduct 20 percent of all dividend checks to a shareholder.

The Administration apparently is going to make a concerted effort also to tighten rules and regulations involving expense accounts. Profit from the sale of depreciable business property, presently taxed at the lesser capital gains tax, would be included as ordinary income and taxed at a higher rate.

A primary reason is a continuous growth and demand for fringe benefits by workers over the country because of the high taxes on wages and salaries.

The business tax today is little short of confiscation. A corporation must pay 52 percent of its profits to the Federal Government before it pays a dime to the stockholder, who risks his capital. The shareholders and investors should get a fair return after taxes. There should be a substantial corporate tax reduction. The tax on capital gains should be gradually reduced and finally eliminated,

according to some of our wisest authorities on taxation.

Because estate and gift taxes are so steep, many family enterprises must of necessity be dissolved or broken up after the death of one of the principals. It is because these small business enterprises are broken up that the larger business enterprises become larger and larger: there will be more and more anti-trust suits filed by the Department of Justice.

African Cement Plants

The changing pattern of trade in growing African markets warrants the close attention of American enterprise, the

Department of Commerce asserts. A 16-page supplement was prepared in line with the Administration's recognition of the increasing importance of Africa in world trade. Drastic changes in the longheld image of Africa as a supplier of raw materials and importer of manufactured goods are occurring. Increasing demand for a wide variety of consumer goods has spurred development of industries involving the use of locally-produced raw materials. Cement plants, shoe factories, textile mills, radio assembly plants and many other types of factories have sprung up from Dakar to Mombasa, and the surface has been barely scratched.

Missile bases Suffer Strikes

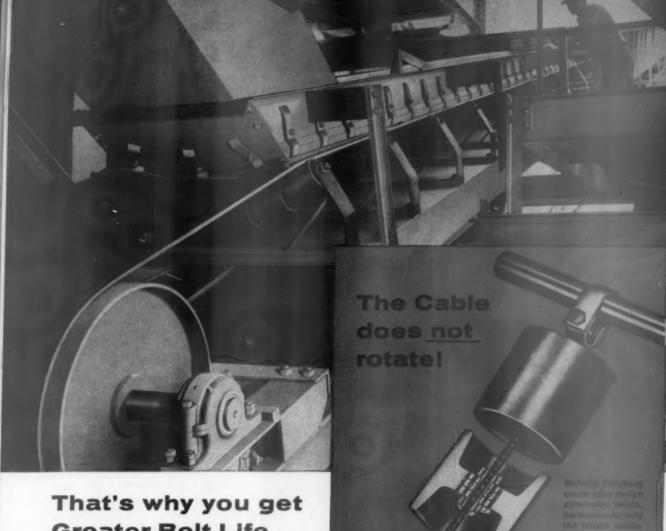
A disclosure bordering on the incredible has been made by the Pentagon. Labor unions averaged one strike every 4

days at Air Force missile bases during the 12-month period ending June 30, 1960. A total of 78,400 man-days were lost in 95 strikes, most of which were called at 4 bases: the ballistic missile launching pads at Vandenberg, Calif.; Warren, Wyo., and Offutt, Neb., and the missile development center at Patrick Air Force base, Cape Canaveral, Fla.

Small business Tax bill Revived

The small business tax bill has again been introduced in Congress. It would reduce both the individual and corporate

tax rates over 5 years to a maximum of 47 percent, with the lowest personal rate being cut to 15 percent. It would also ease tax depreciation for business, and reduce estate and gift taxes to help small firms pass from father to son.



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McNally Pittsburg conveyor design adds big tonnage to your belts, cuts power costs, spares you many dollars in maintenance time and replacement parts. The secret of these savings lies in the patented cradle idler design. Big 5" rubber rollers are suspended in a true catenary, on flexible, stainless steel wire rope. They follow the belt contour, deliver deep troughing action, extend belt life and cut spillage.

Only the rollers rotate. The wire rope is supported at each end by a simple ball joint. It moves freely, adjusts to any belt contour, and provides uniform belt support without any bends or creases. Since the rope does not rotate with the rollers, harmonics are eliminated. The rollers ride on precision-ground ball bearings, which are prelubricated and sealed for life. And you can replace the rollers one at a time if they wear. Easy to erect and maintain—costs less to operate.

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CITY____STATE

Jeffrey processing equipment assures accurate controls in lime plant





Sixteen Jeffrey vibrating feeders draw burned lime from the four kilns for further processing.



Finished lime, feeding from silos onto this Jeffrey HMV conveyor, is blended to suit customers' needs.

If it's conveyed, processed or mined, it's a job for Jeffrey.

Strategically located in the Flats at Cleveland, this Cuyahoga Lime Company plant makes burnt lime immediately available to the two oxygen steel-making plants it serves. As those facilities are increased, the layout here allows for expansion to meet demands.

Sixteen Jeffrey 18" x 38" vibrating feeders are installed; four feeders serve each of the four kilns; all have electronic amplitude control for precise metering of burnt lime for further processing. It passes through an adjustable Jeffrey double roll crusher, after which the lime is stored in three silos according to size.

A Jeffrey HMV conveyor, 71' 6" long and completely enclosed to make it dustproof, runs along under the three silos where the finished lime is stored. Here various sizes are proportioned and blended to meet customers' requirements.

The Jeffrey Manufacturing Company, 935 North Fourth St., Columbus 16, Ohio.





When you put your equipment to work, loads on connecting rod and crankshaft bearings build up to 1,000, 2,000, 4,000 and more pounds per square inch. Engine bearings must be rugged enough to stand up under these two-ton pressures.

Federal-Mogul developed and built the 5-layer, heavy-duty replacement bearing $_{0}$ for just this kind of service. It will take continuous loads up to 4,800 psi \dots triple the load limit of the best babbitts. Five separate layers give you high

fatigue strength for high horsepower engines plus the good "conformability" that's necessary for new bearings to adjust to the crankshaft during break-in.

The complete Federal-Mogul line also includes overplated aluminum-alloy, straight copper-alloy and babbitt bearings. Each is designed for a particular type of engine and gives maximum service in it. When you need replacement bearings, get Federal-Mogul... and you'll get the best.



FEDERAL-MOGUL ENGINE BEARINGS

FEDERAL-MOGUL SERVICE
DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

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LABOR RELATIONS

A roundup of actual day-to-day in-plant problems and how they were handled by management men

How would you decide?



Can management use supervisors to prove that a work quota is reasonable?

What Happened: In 1957 the company installed special machines. Tentative quotas were set during the following months while several improvements in the operation were made. In the first two months of 1959 the company made comprehensive studies of the operation, and new standards and quotas were decided upon.

The employes constantly failed to meet these work quotas. They said that the standards were impossible. Management issued disciplinary reprimands. The dispute continued at a stand-off. Then the workers struck for four days. The strike was called off—although nothing was done to solve the problem. The employes continued to insist that the quotas were impossible to fill.

The company decided to have supervisory men run one of the machines for a full shift under standard conditions—to convince the employes that the quotas could be reached. Time-study experts were present to observe the operation, but there were no hourly-rated workers on the scene. The company had notified the union of its plan. The supervisory men made 98 percent of actual standards—or 127 percent when down time was counted. Because of the excessive down time caused by tool troubles, the quotas were adjusted somewhat.

The following week the union charged that the company had violated the agreement by having supervisors do bargaining-unit work. It asked the company to pay the appropriate production workers' earnings lost from this violation. The union argued:

- 1. The agreement provides that supervisory personnel will do bargaining-unit work only when performing "necessary function of instruction or assistance to employes—determining the operating characteristics of new or revised equipment or processes—or in an emergency—or for experimental purposes. It is recognized that scientific, research and development personnel may perform manual work when such is essential to effective completion of the job."
- 2. There was no "instruction" of employes; no "new or revised equipment or process;" no "emergency;" no true "experimental purpose," and no work "essential

to effective completion of the job."

The purpose of the company's action does not bring it under any of these exceptions.

The company refused the union demand and argued:

- 1. This work was done on Saturday and no employes lost any scheduled hours of work.
- This work was proper. Its purpose was to show that the quotas could be made and to see how the machine worked.

Was the company: Right? ☐ Wrong? ☐

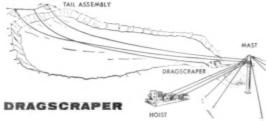
What Arbitrator McCoy ruled: "I think that the company did a wise and sensible thing in an effort to settle a disrupting dispute. Its only error lay in not scheduling the regular process inspector to observe and be convinced. If it had done that, the case would have come under the 'instruction' rule. The company seems to rely heavily on the fact that this work was done on Saturday. If the bargaining-unit work is performed by supervisors and none of the exceptions fit, it is immaterial whether it is performed on Saturday, Sunday or Wednesday. No exception in the agreement fits the work performed. The remedy is to pay the regular operator and process inspectors as if they had been scheduled to observe the operation. The grievance is upheld."

Cut Materials Handling Costs in Half... Dig <u>and Haul</u> with a Saverman Machine

Operating costs as low as 6¢ per ton are reported by Sauerman DragScraper and Slackline Cableway owners. This cost includes labor, power and maintenance when digging free-caving material on average haul distances.

When you use a Sauerman DragScraper or Slackline Cableway, one machine does both digging and hauling from deposit to plant. No double handling is required. You cut labor and equipment costs in half—or even more—because a single Sauerman Machine, controlled by one man, replaces the multiple equipment needed for other methods.



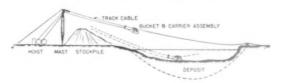


DragScrapers are usually recommended for bank or pit deposits. They dig from hillsides or underwater as easily as on level ground and can haul directly to hopper or field conveyor. The Sauerman DragScraper hoist is designed for continuous duty and many years of service. The operator's control station may be remotely located for maximum visibility of deposit and plant.

DragScrapers are built in sizes from 1/3 to 15 yds. to satisfy practically all tonnage requirements.



SLACKLINE CABLEWAY



When deep digging is required or anticipated in the future, a Sauerman Slackline is usually best for the job. This powerful excavator can dig 100 ft. below water, lift its load and deliver the material to a stockpile on a 1000-ft. span.

The Slackliner Bucket inhauls at high speed and dumps automatically. Dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point, completing the fast operating cycle.

The use of a stockpile permits a single 2-yd. Slackline Cableway to handle the material requirements of a 200-tph. plant. Slacklines are built in sizes up to 3½ cu. yds.



Find out how you can save with a Sauerman Machine. Write or call, giving tonnage requirements and a description of your deposit. Sauerman engineers will supply their recommendations on the most economical machine for you.

SAUERMAN

BROS., INC.

630 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS LInden 4-4892 · Cable CABEX—Bellwood, Illinois

CRESCENT DRAGSCRAPERS . SLACKLINE AND TAUTLINE CABLEWAYS . DUROLITE BLOCKS

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SENIOR COMMANDER

ing plant was designed, it was an immediate success for high-production, low-maintenance performance. Thousands upon thousands of tons later, the proven basic Commander design is still the most productive and profitable on the market. This is the design which has become the pattern for all portable front delivery tandem crusher plants in the new Cedarapids Commander Series line.

There's a profit-proved plant for your job in the

NEW CEDARAPIDS COMMANDER SERIES OF PORTABLE AGGREGATE PLANTS

Now it's easier than ever to select the portable aggregate plant YOU need. Cedarapids has combined its broad line of front delivery tandem crusher plants into one Commander Series of 18 versatile models (some with semi-electric drives), from the Model 111 Pitmaster Commander to the Model 667 Master Commander. Capacities range from 50 tons per hour to 700 tons per hour,

Each of the 18 models is tailored to your particular needs through engineered variations in component sizes and types which can be combined as you wish to meet specifications in your local conditions. And best of all... in the Commander Series you'll find the plant that matches your equipment budget. Your Cedarapids Dealer has the details ... see him today.

Continual improvements in proven basic Commander design and components give you these profit benefits

- 100% portability for quick moves. Horizontal screen always in operating position; nothing to raise, lower or adjust for traveling. Permanently mounted conveyors with self-cleaning pulleys speed set-up time. Optional third axle for large models to meet highway load limitations.
- High delivery discharge; no need to doze out driveway for big trucks.
- Easily accessible controls, centralized to

give operator complete control and full visibility of all operations.

- Conveyors of the correct size and speed to handle high capacities without bottlenecks. Reinforced plant conveyor, selfcleaning pulleys, Iowa-built troughing rolls and idlers cut maintenance costs.
- Large, mono-rail return wheel easily handles high capacities. Adjustable paddles for handling different types of aggregate.



JAW CRUSHERS

Choose the size primary crusher you need, either Twin Jaw or Single Jaw types. Both have profit-boosting engineering improvements: Easy, simple hydraulic adjustment of discharge opening on large crusher sizes; heavy-duty pitman and side bearings set close together to prevent strain; extra-heavy eccentric shaft; extra-heavy flywheels; reinforced electric-welded bases, fully stress-relieved.



ROLL CRUSHERS

Designed to match high capacities of large screens and conveyors: Heavier than average bearings; exclusive feed design to utilize full width of rolls for crushing; higher speed operation (peripheral speed of roll, 500 fpm); patented shim adjustment quickly increases or decreases opening between rolls. Choose the roll crusher size you need to balance the output of the primary jaw crusher.



SCREENS

Cedarapids horizontal vibrating screens are engineered for extremely high capacity per square foot of screening area. You get up to 30% greater capacity than with an inclined screen of the same length. Check these bonus benefits: Snappy, lively action assures fast separation, prevents choking of crushers with screen carryover; fully stress-relieved screen boxes and frames; clamps hold screen wire tight, reduce screen cloth breakage.

IOWA MANUFACTURING COMPANY Cedar Rapids, Iowa Rolls by IOWA

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PEOPLE IN THE NEWS



Quentin Best becomes Consolidated president

Quentin W. Best has been elected president of Consolidated Rock Products Co., Los Angeles, Calif. He succeeds Robert Mitchell who has been named chairman of the board.

Mr. Best is well known throughout the sand and gravel and construction industries. He started his career as a salesman when Consolidated Rock was organized in 1929. During the years he has served as assistant sales manager, general sales manager, vice president and director, and in 1956 he became executive vice president.

He has been active in the National Sand & Gravel Association and the National Ready Mixed Concrete Association. He has been a director and member of the executive committee of NRMCA since 1958 and at the recent convention was elected treasurer for 1961. Mr. Best is

also an active member of the Los Angeles Chamber of Commerce and served as a member of board of directors 1954-55.

Ash succeeds Loomis at New England Lime

William G. Ash succeeds Chauncey C. Loomis as president and chief executive officer of the New England Lime Co., Adams, Mass. Mr. Loomis, who has been president since 1930, has been named chairman of the board.

Mr. Ash, a native of Brooklyn, N.Y., and a graduate of Lehigh University, joined Nelco Metals, Inc., a subsidiary of New England Lime Co., in 1943 as plant superintendent. He was made vice president in 1951 and president in 1960, at the same time he became vice president of New England Lime Co. Previously, Mr. Ash was associated with U. S. Gypsum Co. as manager of the Philadelphia, Pa., plant and later the Falls Village, Conn., plant.

Clarence Barinowski retires

Vulcan Materials Co. has announced the retirement of Clarence A. Barinowski as commercial vice president after 44 years of service. He will continue to serve Vulcan as a consultant, working primarily with the Alabama and Georgia aggregates divisions on special projects. He will also continue as a director of the company.

Mr. Barinowski's retirement

climaxes a career that began with the old Birmingham Slag Co. in 1917 as secretary to C. Eugene Ireland. Through Mr. Barinowski's efforts, a partnership between Birmingham Slag and Lambert Bros. produced Stockbridge Stone Co., now a Vulcan division.

Mr. Barinowski is a director of the National Crushed Stone Association, National Sand & Gravel Association, and National Slag Association, of which he served three terms as president.

Sven Thyrre elected F. L. Smidth president



Erik Thune, chairman and president of National Portland Cement Co., has announced, in his capacity as chairman of F. L. Smidth & Co., New York, N.Y., that Sven G. Thyrre has been elected his successor as president of F. L. Smidth & Co. Mr. Thyrre will continue to serve as executive vice president of National Portland Cement Co.

Please turn to page 40

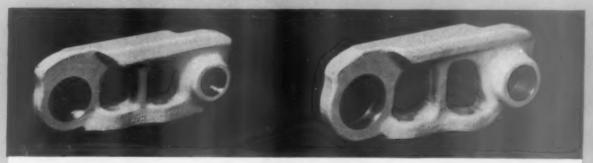
Special report to users of Cat D6 and D7 track parts



Up to 25% Longer Link Life at No Increase in Cost

New track links have rails <u>hardened</u> deeper than any other brand . . . hardness with <u>file-like</u>, wear-resistant qualities

You can't "see" metallurgy and heat treatment in track links. But you'll definitely see the results in the extra life you get from the new Cat D6 and D7 track links. These superior links will outlast all other brands yet the suggested price is no higher than before.



D6, 955 AND 561 LINKS

- m "Hi-Electro" hardened rails give outstanding wear life.
- Rail wear cases are twice as deep as other brands.
- Closer bore telerances retain pins and bushings better.
- Full 1¼" top rail surface to pin boss clearance allows more wear before roller flange contact.

D7, 977 AND 572 LINKS

- 12% thicker rails eliminate peening, rebuilding distortion.
- 32% thicker struts and more steel in critical areas increase ever-all strength, resist cracking.
- File-hard "Hi-Electro" hardened rails withstand abrasive wear.
- Uniform, wear-resistant rail cases deeper than other makes.

These new track links are made from special steel, carefully pretested before manufacture. They're forged, machined and heat treated to develop maximum strength and toughness. A non-peenable wear barrier is induced deeply into rail top and sides by exclusive "Hi-Electro" hardening. This exacting heat treatment permits maximum, file-like wear resistance without brittleness.

Try the new links . . . and the many other special-purpose tractor undercarriage parts, all designed and built to keep your cost-per-hour to a minimum. Cat undercarriage specialists can help you select right combinations and give you money-saving recommendations tailored to your particular needs. It's all a part of your Dealer's Custom Track Service . . . the practical approach to lowering undercarriage costs by extending part life and machine availability through proper parts selection and parts care.

Etched rail cross-section shows deep, uniform wear case found on top and sides of new links.



CATERPILLAR

Colorpiller and Cot are Registered Trademarks of Caterpiller Tractor Co.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

NEW DUPONT SUPER "TOVEX" GEL GIVES YOU 20% MORE POUNDS PER FOOT...MORE PUNCH PER POUND



You handle it like regular "Tovex" Gel.

You *load* it like "Tovex" Gel – slitting the plastic bag and dropping it in the hole.

You prime it as easily as "Tovex" Gel.

But when you *shoot* it, you know it's Super "Tovex" Gel—the new non-nitroglycerin gelatin that is now available in a 20% denser grade to help you break hard rock at lower cost.

Not only is Super "Tovex" non-nitroglycerin gelatin 20% heavier per foot of borehole, but it also packs a higher explosive wallop per pound. You can — in many cases — increase your burdens and spacings. So, you save drilling costs.

What else?

Besides higher bore-hole density and more usable energy, here are other ways you can improve your blasting with Super "Tovex" Gel:

More Safety: You operate more safely than with nitroglycerin dynamites.

No Headaches: No ingredient to cause headaches among your blasting crews.

Won't Propagate: Lets you take advantage of short interval delay blasting, even in the most saturated ground... without propagation between holes.

Resists Water: You can expose it to high heads of water for long periods of time.

Loads Eastly: Just slit the bag and drop into the hole to get maximum density. A small loading crew can do the job.

Primes Easily: Can be primed with Du Pont HDP-1 Primers, "Nitramon" Primers, "Nitramite" Primers or "Hi-Velocity" gelatin dynamite.

How soon do you want these savings?

Super "Tovex" Gel is ready now. Your Du Pont Explosives representative or distributor has it. Call him for further information, or write: Du Pont, 2446 Nemours Bldg., Wilmington 98, Delaware.

Super"TOVEX"gel





"ORIENTED" DIAMOND CORING BIT Available in four different matrices and three different grades of correctly-sixed diamonds. EX, AX, BX and NX sixes carried in stock. Larger sixes and special designs fournished to meet any specifications or requirements.

YOU REALLY SAVE MONEY

"M" SERIES "ORIENTED" DIAMOND CORING BIT

DIAMOND CORING BIT
For use with "M" SERIES Core Berrel, when
good cores must be secured from soft or friable strate. Available in all four types of
matrix and three different grades of dismends. Also in a complete range of impregnated sizes. EX, AX, BX and NX sizes carried
in stock.

SPRAGUE & HENWOOD

"ORIENTED" DIAMOND BITS

WHEN YOU BUY OR SPECIFY



Developed with the co-operation of the United States Bureau of Mines, Sprague & Henwood "Oriented" Diamond Bits can really save you money... save it by giving you better performance, at a minimum of diamond loss.

If you have bits that need resetting, send them in, stating conditions under which they have been used. In most cases, they will be shipped back fully renewed with diamonds "Oriented" within 3 or 4 working days after we have received them. Suggestions and recommendations aimed at obtaining better results with your diamond bits will be made upon request.

Send for complete "Oriented" story and New Diamond Bit Catalog #320-1 today.

SPRAGUE & HENWOOD, Inc.

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People in the News

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W. Julian Parton heads General Crushed Stone

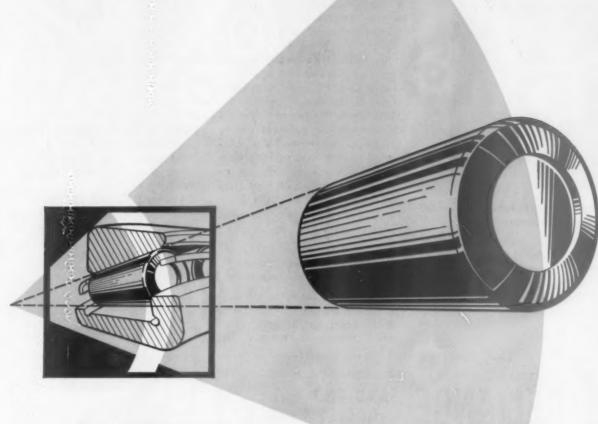
W. Julian Parton has been elected president of The General Crushed Stone Co., Easton, Pa. Formerly vice president of operations, Mr. Parton succeeds Oscar E. Benson, who died April 6.

Mr. Parton joined General Crushed Stone in 1955 and served as assistant to the president and director. He was elected vice president of operations in 1959. A mining engineering graduate of Pennsylvania State University, Mr. Parton received an MS degree from the University of Washington and the professional degree of engineer of mines from Penn State.

Thomas C. Foote, general sales manager, has been named assistant to the president. A graduate of Dartmouth College with a BA degree, Mr. Foote joined General Crushed Stone Co. in 1954 and served as assistant purchasing agent, purchasing agent and assistant to the vice president.

Edwin E. Dotter has been named operations manager. He has been serving as general superintendent since 1954. Prior to that he served as assistant general superintendent and as plant superintendent. He joined the company at White Haven in 1915. He is a graduate of Valparaiso University, receiving bachelor of commercial science and bachelor of science degrees.

Please turn to page 42



What Bower does to roller heads to give tapered bearings longer life

The spherical head design shown above is part of what we call "Spher-O-Hone". It simply means that Bower tapered roller bearings perform better, last longer.

Bower grinds roller heads with a spherical radius. This assures accurate roller alignment, which eliminates sliding and skewing. An "O" shaped groove is provided at the base of the cone flange for positive roller head lubrication. And the cone raceway and flange face are honed precisely.

These further lessen friction, thus reducing wear.

This is typical of the attention paid to details in design and manufacture by Bower engineers. And to you this attention can mean faster schedules, less downtime and greater profit from each job because Bower bearings handle maximum capacity loads and last longer.

When you need tapered or straight roller bearings of any type or size, be sure to specify Bower.



BOWER ROLLER BEARINGS

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. . DETROIT 13, MICH.

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People in the News

continued from page 40



James P. Giles heads **American Cement Corp.**

James P. Giles has been elected president and chief executive officer of American Cement Corp., Philadelphia, Pa., succeeding Walter C. Russell, who will continue as vice chairman of the board of directors, a member of the executive committee and as

a consultant. Mr. Russell has served American Cement and its predecessor companies since 1933.

Mr. Giles, who became executive vice president of American Cement Co. in 1960, began his career in the cement industry in 1951 when he joined Hercules Cement Co. as assistant to the president. He served in a number of executive capacities with Hercules before becoming president in 1958, at which time Hercules, Peerless and Riverside merged to form the American Cement Corp.

Warner announces changes in Lime Division management

Clarence B. Rule has been appointed manager of operations of the Lime and Limestone Division plants of Warner Co.,

Philadelphia, Pa. Mr. Rule has been associated with the company since 1951 and formerly held positions in the engineering department. He is a graduate of Drexel Institute of Technology.

Herschell A. Corre has been appointed plant manager of the Bellefonte plant. He joined Warner Co. in 1947 as superintendent of mining operations and in 1958 was appointed plant superintendent in charge of both mine and plant.

George I. Purnell, Jr., has been promoted from plant superintendent to plant manager at Cedar Hollow.

Paul A. Krentel has been appointed vice president of sales. He is a graduate of Michigan State College with a BS degree in chemistry and received his MS degree in organic chemistry from Lehigh University.



John A. Miller, retired president and chairman of Penn-Dixie Cement Corp., New York, N.Y., died April 11 after a short illness. He was 88 years old.

Born in Baltimore, Md., Mr. Miller attended Blair Academy, the Lawrenceville School and Lafayette College. He began his business career as a general contractor on railroad projects in eastern Pennsylvania.

In 1926 the Pennsylvania-Dixie Cement Corp., which in 1951 changed its name to Penn-Dixie Cement Corp., was formed to acquire the Pennsylvania Cement Co., Dixie Portland Cement Co. and Clinchfield Cement Corp. Mr. Miller became president of the new concern, serving until 1928, when he became chairman of the board. He was president again from 1936 until his retirement in 1945.



42



THIS MARION HAS LOADED 500 YARDS OF LIMESTONE AN HOUR....

When it needed to. And, that's the point. Even though the average production in this southwestern quarry is set at a somewhat more moderate pace, it's significant to note this Marion 112-M electric shovel, with a $4\frac{1}{2}$ yard dipper, has the ability to produce at peak efficiency when called upon to do so. In that respect it is similar to all the machines in Marion's continually growing line of excavators. It's a point to remember when you consider the purchase of your next loader.

MARION POWER SHOVEL COMPANY . MARION, OHIO

A Division of Universal Marion Corporation

Take 15 minutes on a

Prove New International TD-15 cost-cutting capacity tops the 100 hp class

Advantages in heavy-duty hp and in working speeds give the new TD-15 extra work capacity to cut costs, boost earnings—as compared to competitive rigs. You can prove it, positively. Advances in strength, wear-resistance, temperature control, and operating ease mean big gains in component life,

upkeep economy and machine availability to owners of new International TD-15's. You can prove it, beyond doubt, without risk. Let your International Construction Equipment Distributor give you the revealing 15-minute new "15" demonstration, now!

Prove new TD-15 capacity dozing heavy materials

Fast, easy new TD-15 shifting saves effort, increases output. Size up the new "15's six-speed, full-reverse transmission with speeds spaced to use extra power and often work a speed faster than competitive rigs. See how the six speeds forward, six reverse, are arranged for easy short-travel, single-stick shifting. Change forward-reverse direction fast with the "Shuttle-Bar." Check the power-transfer efficiency and operating ease of the new "15's heat-defying, dry-type sintered metal engine clutch!

Give the new "15" a steady job of bulldozing solid materials! Advances like tapered, anti-friction bearings of greatly increased capacity — heavier shafts and deeper, stronger gear teeth — add thousands of hours to transmission component life. New transmission oil pump circulates and filters lubricant for longer gear life. Measure the added economy of features like the new sintered metal steering dutch discs which outlast previous type even while handling greater torque loads!





Compare hp and performance protection!

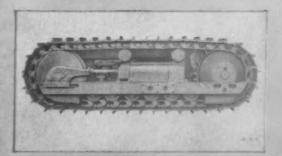
Start the new TD-15's 6-cylinder engine push-button easy—and get the seconds-fast warm-up which only International's famous gasoline-conversion starting provides. Note that full load for the new "15" is an overload for other rigs of the 100-hp class. See how the new pressure-type cooling teams with the larger capacity radiator—to give positive temperature control in hottest weather at full capacity 'round the clock.

Look at the "15's" new dry-type air cleaner. It's 99.8% efficient — and 100% convenient! Handy, underhood mounting and transparent, quick-dump collector greatly simplify servicing. International even provides a dash indicator that shows red when element needs servicing!

Prove new "15's" undercarriage strength!

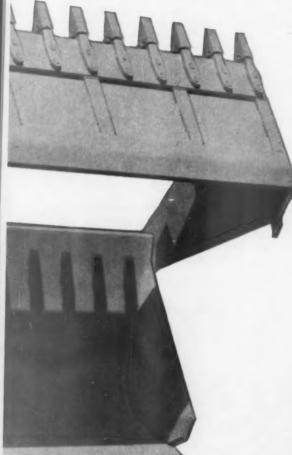
To go along with precision-welded double-box-beam TD-15 track frames is the added strength of drum-type front idlers — the added protection of frame-welded track chain guides — the added service life of self-cleaning, power-saving strutless track links. The new "15" is the only crawler of its power class with the shock-load prevention of ball-joint suspension — basic in International's famous 3-point track mounting design! Improved, high-efficiency full-floating seals protect the long life Dura-Rollers — the track rollers you grease only once per hundred 10-hr. shifts!





"Mister ... it clam-action to 'put the on today's tight bucks!

takes bite'



"15 minutes on this new '15' Four-in-One will prove you can't afford to own any limited-duty bucket!"

"Sure, a racehorse loader with a 'lock-jawed' bucket may gain you a few minutes a day-just dipping from a stockpile and dumping in a truck!

"But anywhere else we double-challenge you to stack any limited-duty loader against a new '15' clam-action 4-in-1, and see what happens. We can tell you right now what'll happen no matter what size, shape or color the single-action rig is, or how shifty it is! It'll get clobbered! And, profitwise, so will the guy who buys the obsolete bucket without bothering to find out what a slew of jobs the new '15' Four-in-One does.

"You can get the straight dope, first hand in 15 minutes, on this new TD-15 Four-in-One. In just one quarter-hour, you can prove what it means to own the one and only machine that doubles for a whole spread of contracting equipment—at the touch of a hydraulic lever.

"In only 15 minutes, you can put the 'bucket with the bite' through its paces. Prove how you get four, or a dozen, or more, full-sized, full-capacity machine actions with the exclusive 4-in-1. Prove you get hundreds of job-handling working positions with each action.

"See how new TD-15 Four-in-One get-up-and-go is tailored to set a fast work pace, with the single-stick shift, full-reverse transmission, and plenty of hydraulic control power.

"C'mon in now-take 15 minutes on a new '15' Four-in-One. Or call us for a demonstration on your job. See for yourself why you can't afford to own any obsolete 'lock-jawed' loader."

International Harvester Company, Chicago 1, Illinois Drott Manufacturing Corp., Milwaukoe 15, Wisconsin



INTERNATIONAL.

DROTT

"'Doze, grade, grab, spread, do cutand-fill work, strip, load sticky materials, outshovel a power shovel, pick up loose materials (without chasing them), grub, load 'impossibles.' Do dozens of other profitable jobs with the new '15' Four-in-One that single-action loaders can't touch."



Two cost-whacking Payhauler units equal five 11 cu.yd.haulers

-for Quality Lime Products Corp., Sumterville, Florida

Up the soupy, slippery ramp, the 95 Payhauler steadily climbs out with its 27-ton loads of lime rock. Dragline excavated from underwater, the dripping wet rock keeps the ramp sloppy, while being hauled up to the stockpile.

Quality Lime Products Corp., Sumterville, Florida, has proved that two 95 Payhauler units match production of five 11-cu. yd. end-dumps. The savings in labor and operating cost are huge!

Only two rigs to man, fuel, and maintain instead of five. Only minimum dead weight to move. Payhauler has the International-developed weight-shedding corrugated body, that increases tontoting capacity and climb-ability.

"On this wet ramp operation, the DT-817 engine, through torque converter transmission, assures maximum tonnage without loss of traction," states Superintendent W. W. Reynolds. "The Payhauler is well-balanced, easy to operate, and operator acceptance has been excellent. Each '95' stockpiles up to 1,500 tons of material per 10 hrs., hauling 1.3 miles."

Power-punch of the 27-ton 95 Payhauler is the International DT-817 diesel—turbocharged to deliver 375 high-torque hp, through power-shift torque converter or 9-speed air-shift transmission. The 19-ton 65 Payhauler is also powered by the "817," naturally aspirated to produce 250 hp through 10-speed constant-mesh transmission.

And both Payhauler models have full-torquetaking planetary final drive design—reserve area power braking—"one-hand," road-holding power steering—11-second dumping.

Compare Payhauler grade charts—compare cycle-gaining Payhauler performance on grades and tough hauls. Size-up Payhauler dependability and long life features. Let your International Construction Equipment Distributor demonstrate.

In typical slippery, sloppy going, a 95 Payhauler climbs with its full load of wet lime rock—for Quality Lime Products Corp., Sumterville, Fla. The ramp rises 40 feet, and has two turns, in the first 500 feet of the haul!

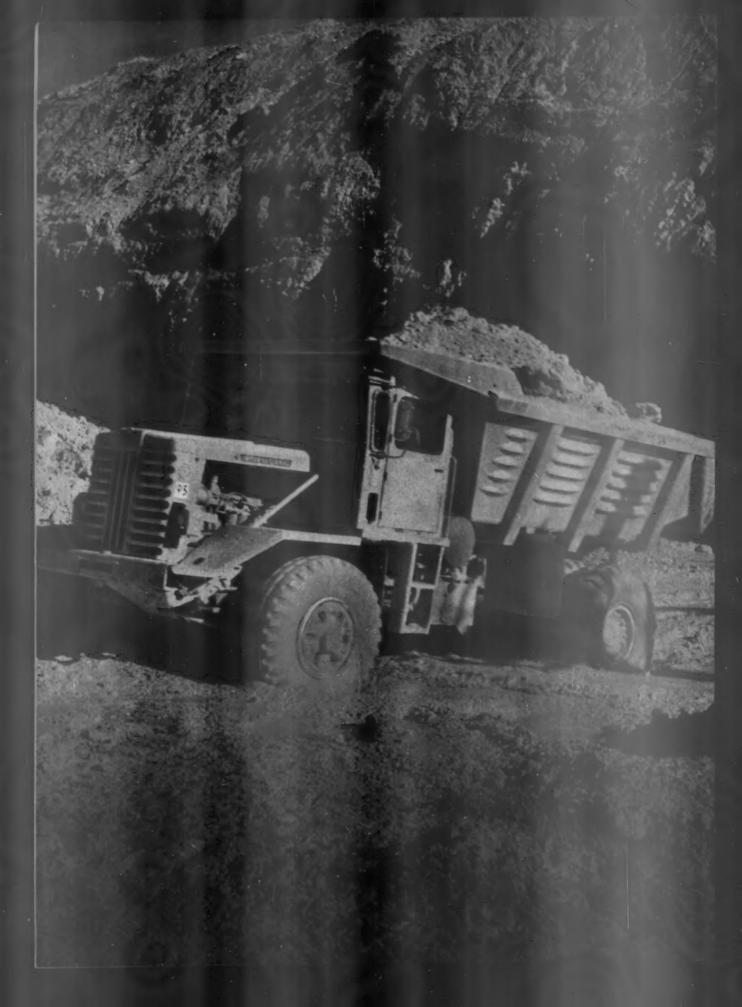
With exclusive action-speeding, inverted hoist design, a 95 Payhauler dumps its load in only 11 seconds, ready to high-tail back for another load. The lime rock is air dried, then fed to crusher by dozer and dragline to produce road base and stabilizing material.





International' Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Iliinois A COMPLETE POWER PACKAGE



INDUSTRY NEWS



Open house shows off modernized Marquette plant

The completely refurbished Marquette Cement Co. plant at Nashville, Tenn., was inspected by several hundred representatives of industry, government and the press on May 22. The occasion marked the end of a three-year building plan which completely transformed the plant.

With a single 11½ x 450-ft. kiln, the wet process plant can make more than 1¼ million bbl. of masonry, high early strength, and Type I portland cements.

Visitors were introduced to a number of unusual pieces of equipment, some of which are used for the first time here. For one, rail cars of limestone, fly ash and coal are handled in a large, hydraulically operated car puller. This unit is operated in conjunction with a rail-mounted car shaker to let a single man spot cars over an unloading hopper and to unload them quickly.

A combination rod and ball mill greatly improves the efficiency of the raw grinding system. This is one of the few rod mills working in a cement plant—possibly it's the only combination mill. The first compartment of the 9 x 38-ft. mill holds 55 tons of rods about 11½ ft. long. The second holds about 85 tons of grinding balls.

Three nuclear devices play an important role in automatic control of the mills and kiln. One unit on the discharge pipe of the raw grinding mill senses the density of the slurry. It regulates the amount of water going to the mill to maintain a mixture with about 34 percent water. Another unit "watches" the amount of oversize coming back into the finish grinding circuit. It calls for more or less feed of new material to the mill. This system not only provides a more constant feed to the mill, but it has increased production of the mill rates and the uniformity of the finished cement.

The 6 x 100-ft. horizontal grate cooler is equipped with a gamma ray gauge that senses the depth of material in the cooler. While

this is now an almost conventional application of a nuclear device in the cement industry, it does add greatly to the efficient performance of the kiln and cooler.

Kiln exhaust gases are stripped of dust in a mechanical and an electrostatic dust collector. All of this dust—about 50 tons a day—is wetted and sent to a thickener tank. Soluble alkali salts are removed with the waste water, while the sludge is returned to one of the kiln feed tanks.

This Nashville open house was also an occasion for Marquette's directors to meet many of the civic leaders of western Tennessee. At the same time, the directors visited the plant's limestone quarry some 26 miles from Nashville.

Utah plant to compete with doubled capacity

Portland Cement Co. of Utah has spent \$2.5 million to expand and modernize its Salt Lake City operation. A new 10 x 300-ft. rotary kiln has been installed, as has a 11½ x 17-ft. steel ball mill, dust collection equipment and an automatic control center.

Special pride of the plant is a new truck loading apparatus, as about 75 percent of the 3,000 bbl. daily output is picked up by truck. The accompanying 90-ft. scales will fill a 125-bbl. truck in only 4 min., compared with the previous time of 35 min.

Please turn to page 54

"PERFORMANCE EXCEEDED FONDEST HOPES"



Santa Barbara municipal dredge La Reina, "The Queen".

PERFORMANCE of this



City of Santa Barbara

California

February 2, 1961

Gentlemen:

I can't say enough good things about our Thomas Pump. Its performance and wearing qualities has exceeded our fondest hopes. Our pump is the MCL Series with a la" suction and a 12" discharge. It is working against a line pressure of 120 lbs.

The sand being pumped is a small granular, very sharp beach sand.

The wraring parts give exceptionally good ser-vice. For example, we pumped 700,000 yards of sand before having to replace a Shell liner and 400,000 yards before replacing an impelier. The seal rubbers on the suction sade have to be re-place more often, of course, due to the very high head involved.

The service on parts have been very prompt. The courtesy and efficiency of Thomas Engineers in solving the few problems that we had has been of the highest order.

Yours truly,

Hong Hoing H. H. Wing Ass't Street Superintendent

THOMAS PUMP PROVES THAT

"YOU CANNOT BUY AT ANY PRICE A MORE DURABLE PUMP THAN A THOMAS FOR SAND AND GRAVEL-YOU CANNOT BUY ONE WHICH WILL MAKE YOU AS MUCH MONEY"

How would your dredge pump perform, operating in sharp granular sand against a high dynamic head approaching 300' and with a line pressure of 120 lbs psi? Well, is your pump a Thomas? See Mr. Wing's letter at

Its the same story of successful use and operation of Thomas DURABLE Dredge Pumps that has been told for years.

Thomas DURABLE Dredge Pumps are manufactured in range of sizes from 6" to 16" discharge. Additional information on request.



The famous annual Old Spanish Days Fiesta will be held at Santa Barbara this year on August 9-13. See if possible.

THOMAS FOUNDRIES Inc. P. O. BOX 1111, BIRMINGHAM, ALABAMA











Enter 1474 on Reader Card

"Eagle Sand Section does perfect job"

"Washes and thoroughly classifies as fast as we can haul material from the pit" says Jack Pilley, operator, Hagerman Sand & Material Co., Hagerman, N. M.

At right is shown the Eagle Sand Washing-Classifying-Dehydrating Section at the plant of Hagerman Sand & Material Co. Jack Pilley, operator, is pleased with its performance and finds a ready market for the controlled quality material produced. He finds the Eagle Sand Section simple and economical to operate.

It consists of a 20' Water Scalping-Classifying Tank with snap-action electric-hydraulic bleeder valves, quick-adjusting metering splitter gates and 3-cell collecting-blending flume. One gradation of material flows from one cell of the flume to a 24" x 25' Single Screw Washer-Classifier-Dehydrator at right, which turns out mason

sand, while an identical unit, at left, running at full speed, turns out concrete sand. A small amount of rejected material flows from the third cell of the 3-cell flume to waste.

No other combination of processing equipment can so economically and effectively control classification to give a producer the gradations that are needed and which can be profitably marketed—no other equipment for this job requires so little maintenance and costs so little to run. Eagle's vast experience assures you of getting your full measure of profit from the operation of Eagle Equipment. Send for your copy of new fact-filled 48-page Catalog 61.

get extra
revenue with
an Eagle Mixer!





an Eagle Mixer will mix a variety of road base and road surfacing materials right at your plant, for trucking to road jobs!

A number of producers are making extra money by providing various road base mixes to highway contractors, economically doing the mixing in an Eagle Portable, Self-Erecting Mixer. Easily hauled from site to site. Hydraulically raised to provide 9' clearance for truck loading—quickly lowered. No ordinary pug mill, the Eagle is a heavy duty mixer with big wear-resistant Ni-Hard corrugated paddles that really blend and mix any combination

of dry, wet, or viscous material for road base or road surfacing materials. Capacities from 125 to 900 t.p.h. Complete with power, drive, spray bars, flow meter and control valve. Low initial and operating cost. Auxiliary equipment available for adding cement, asphalt, calcium chloride or other additives. Also stationary models in 5 sizes. Unit shown is at Superior Stone Co., Div. of American-Marietta Co., Mebane, N.C. Send for Bulletin 1258.

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS
137 HOLCOMB AVE., DES MOINES, IOWA



Enter 1408 on Reader Card



NEW, IMPROVED CAT 619...SERIES C...ALL NEW 4-CYLINDER ENGINE...
24% MORE HORSEPOWER...COMPACT...ECONOMICAL...CHOICE OF POWER
SHIFT TRANSMISSION, DIRECT DRIVE...COMPLETE UNIT CONSTRUCTION...EASY SERVICING...NEW TIRE SIZE...AIR ACTUATED, LIVE POWER
CABLE CONTROL...IMPROVED 18 YD. (14 YD. STRUCK) SCRAPER.

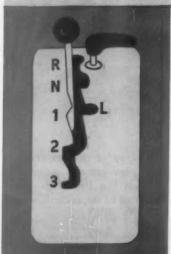
Caterpillar Tractor Co., General Offices, Peoria, III., U.S.A.

CATERPILLAR CAMPAGNIC ORD COST FOR PROPERTY OF CONTROL CO.





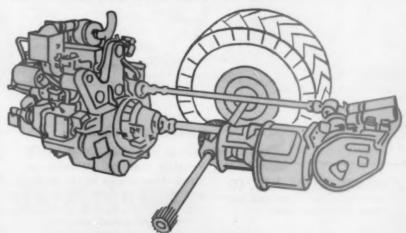




New 280 HP 619C offers choice of power shift transmission for faster, easier operation or direct drive transmission. Air actuated, live power cable control reduces operator effort. New, bigger 26.5 x 29 (22 ply) tires improve roadability. Top speed: 30 MPH. Capacity of matching Lowbowl scraper: 18 cu. yd. heaped, 14 cu. yd. struck. Also available: 25 ton PR619 Rear Dump Trailer built by Athey Products Corp.

New power shift transmission provides 9 speeds forward with just 3 shifts. One lever gives operator instant selection of 3 speed ranges . . . dial indicator tells him when to shift. Within each speed range, transmission automatically shifts to torque divider drive, direct drive or overdrive to match job conditions. The 619C with power shift transmission always operates at the right speed and power for the job at hand.

New, more powerful Cat D340 Engine (280 HP maximum, 250 HP flywheel at 1900 RPM). This economical 4-cylinder engine burns No. 2 fuel oil...has parallel-ported dual intake and exhaust valves and overhead camshafts for most efficient operation...has pressure ratio controlled turbocharger and aftercooler. Swingaway dash and pivoted crankcase guard simplify servicing. Unit construction assures easy servicing: engine, transmission, planetary final drives can be removed without disturbing adjacent components.

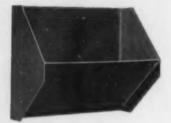


Conveying Costs got You over a bucket?

Swing to

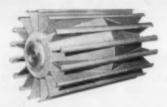
STANDARD METAL

Elevating and Conveying Equipment



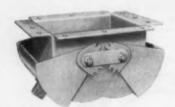
CONTINUOUS ELEVATOR BUCKET STYLE NO. 2.

Styles include Salem, Style "A" and other continuous style buckets.



WING-TYPE SELF-CLEANING PULLEY.

Dedge Taper-Lock®Hubs and Bushings Standard. Available also with solid hubs bored to specifications.



DUPLEX BIN GATE.

Single Bin Gates also available.

WRITE FOR CATALOG SHOWING THE COMPLETE STANDARD LINE.



STANDARD METAL MFG. CO.

111 CENTER ST. . MALINTA, OHIO

Enter 1439 on Reader Card

Industry News

continued from page 50

Canadian minerals—a roundup for 1960

The Mineral Resources Div., Department of Mines & Technical Surveys, Ottawa, has published a rundown on the year in the Canadian mineral industry.

According to the bulletin, shipments of basic raw materials comprising clay products, nonmetallic minerals, and construction materials increased in 1960 by 1.5 percent to a record \$503,967,000. New production records were established for asbestos, nepheline syenite, elemental sulfur and sodium sulphate.

Cement capacity increased during the year by 14 percent to $8\frac{1}{2}$ million short tons. The recent rise has brought the industry's capacity to 35 percent above the record shipments of 1959, resulting in increasingly keen competition.

Gypsum shipments declined over 10 percent from 1959's peak. However, adjustment in the unit value of crude gypsum exports resulted in a 12 percent increase in total value.

Probably the world's largest high-grade potash deposit, in southern Saskatchewan, is being explored for mining by several companies. The Blairmore foundation, with mineable depths ranging from 2,800 to 3,400 ft., is composed of wet, unconsolidated strata which pose serious technical difficulties. International Minerals & Chemical Corp., Ltd., has succeeded in sinking a concrete shaft at Esterhazy, proceeding by the freezing method.

Last year saw greater interest in pozzolans in western Canada. Holdfast Natural Resources, Ltd., is developing a deposit of volcanic shale on Vancouver Island as a source of natural pozzolan, and other interests are working in Saskatchewan.

The Canadian lightweight aggregate industry currently comprises: expanding clay and shale—10 plants; recovering expanding slag—3 plants; exfoliating vermiculite—10 plants, and expanding perlite—8 plants. Now established is the production of heavy aggregate for concrete to be used in shielding nuclear installations.

Asbestos shipments soared to an all-time high 6 percent ahead of the previous peak year, 1955. The grades most in demand were those used by the asbestos-cement industry.

Here are comparative statistics on Canada's industrial mineral shipments for 1960 and 1959:

	1960		1959	
Mineral	short tons	8	short tons	- 8
Barite Fluorspar	155,506	1,446,621 1,958,236	238,967	2,254,582 1,850,497
Gypsum Lime	5,161,000 1,533,673	9,308,340 17,037,970	5,878,630 1,685,725	8,393,703 21,304,021
Nepheline syenite	240,200	3,030,300	228,722 3,289,976	2,930,932 18,034,522
Salt Silica	3,206,164 2,235,795	18,644,203 3,322,824	2,163,546	3,436,730
Sulfur (elemental) Clay products	254,729	4,679,382 40,042,494	145,656	2,620,787 42,515,448
Cement	5,697,859	91,111,862	6,284,486	95,147,798
Sand & Gravel	189,961,321	110,086,610	185,123,746	104,651,461
Stone	43,404,986	56,678,612	46,439,535 1.050,429	60,958,784 107,433,344
Ashestos	1,140,538	118,700,998	1,000,429	107,400,044

Kennedy's tax incentives

Pros and cons of the New Frontier taxation attitudes are aired almost daily in the papers and newsmagazines. Here is a capsule listing of the tax incentives for investment expenditures which the President proposes instead of depreciation lib-

Please turn to page 59

THEY PUT THEIR SYMONS® CONE CRUSHERS ON WHEELS FOR A 700 TON PER HOUR PORTABLE PLANT



SYMONS® CONE CRUSHERS

. . . the machines that revolutionized crushing practice . . . are built in a wide range of sizes, for capacities to over 1500 tons per hour. Write for descriptive literature,

... and A. Teichert & Son, Inc. can move, set up and resume production in minimum time

When A. Teichert & Son, of Sacramento, decides to custom-build a portable plant, they refuse to sacrifice capacity for mobility. That's why they selected two Symons Cone Crushers as the heart of this unitized plant. They can produce up to 700 tons of $1\frac{1}{2}$ " base material per hour. Even crushing 50%, they usually exceed 500 tons per hour. And with all units trailer-mounted, they can move quickly from one job to another and start producing immediately. Set-up consists of adjusting the jacks, erecting the conveyors and connecting the power.

This Teichert plant is supplying aggregate for road-building projects in northern California, a job requiring frequent moves. The highly mobile plant includes two Symons Cone Crushers . . . a 4½ ft. Standard Cone as secondary, and a Symons 4 ft. Short Head Cone for closed circuit tertiary reduction to ¾ x ¾ hot mix aggregate and ¾ x 0" sand.

Mounting Symons Cones on wheels is a typical example of how experienced aggregate producers take advantage of high stationary plant capacities for greater portable plant profits.

Write for descriptive literature.



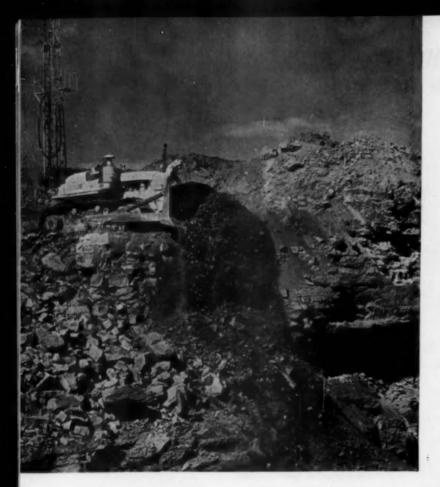
NORDBERG MANUFACTURING COMPANY · Milwaukee 1, Wisconsin





SYMONS... a registered Nordberg trademark known throughout the world.

ATLANTA CLEYELAND DALLAS DULUTH HOUSTON KANSAS CITY MINNEAPOLIS NEW ORLEANS NEW YORK PHOENIX ST. LOUIS SAN FRANCISCO TAMPA WASHINGTON WICHITA, KANS. TORONTO VANCOUVER JOHANNESBURG LONDON MEXICO, D. F.



"CLASH-BOX" robbing your CASH-BOX?

Crawlers without full-power shift are obsolete . . . and costly!

If your crawlers have master clutches and manual shift transmissions—"clash-boxes" as they're commonly called—you may be passing up profits that should be yours.

With proven Torqmatic Drive in the Model C-6 and the TC-12, Euclid Crawlers provide full-power shift and instant reverse. There's no loss of power or momentum when changing from one speed range to another... no delay for clutching and shifting... and with a flick of the wrist you change travel direction fast. It's a dependable power train, too... proved in thousands of "Euc" earthmovers on every kind of job.

Have your dealer show you how Euclid Crawlers have more productive capacity on any tractor work...dozing, ripping, push loading big scrapers, or towing heavy loads. The seconds they save on every work cycle can add up to more cash in your cash box!

EUCLID Division of General Motors, Cleveland 17, Ohio Plants at Cleveland and Hudson, Ohio and Lanarkshire, Scotland.



Proven Torquatic Drive provides smooth steady flow of power ... full-power shift ... instant reverse... easy operation. Far push loading scrapers the fast maneuverability of "Euc" crawlers cuts scraper cycle time and steps up production ... changes from one speed range to another, and from forward to reverse and back again, are made under full power... there's no clutching.





Industry News

continued from page 56

eralization. There would be a tax credit of: (1) 15 percent of all new plant and equipment investment expenditures in excess of current depreciation allowances; (2) 6 percent of such expenditures below this level, but in excess of 50 percent of depreciation allowances; (3) 10 percent of the first \$5,000 of new investment as a minimum credit, and (4) an overall limitation of 30 percent in any one year.

Granule output doubles, due to new Missouri plant

On a 915-acre tract in southeast (Annapolis) Missouri, The Ruberoid Co. is planning operations that will initially increase their roofing granule output by 60 percent.

Roofing granules—carefully graded crushed rock—give added resistance, attractiveness and life to asphalt roofing. At the new site, on which core-drilling indicates 100-year ore reserves, mining of the rhyolite ores, milling, synthetic coloring and storage will be carried on. The Annapolis plant will primarily supply Ruberoid's roofing plants in the midwest and southwest.

NOTICE

Rock Products subscribers, Concrete Products subscribers, and prospective subscribers

We have been informed that a Mr. Thomas Kelly has been representing himself illegally as being affiliated with Rock Products or Concrete Products magazines. It is also believed that he may have used the name of Tom Ryan. We've had reports that he sells subscriptions to both magazines.

In the knowledge of the present publisher, this Mr. Kelly is not now, nor never has been, associated with Rock Products magazine or any of its affiliated publications. Under no circumstances should he be given cash or a check for a subscription. If he presents himself as a representative of either magazine, please call us collect immediately at RAndolph 6-2802 in Chicago, Illinois

Illinois bulletins reveal mineral status

Two bulletins were recently issued by the Illinois State Geological Survey in Urbana.

In one, the state's mineral industry is summarized from 1951 to 1959. With regard to the rock products industry, minerals such as common sand and gravel, stone, cement and lime ingredients contributed over one-sixth of the total value of Illinois' 1959 mineral production.

The state leads the nation in supplying fluorspar. Other highly important products are refractory and other clays, silica sand, natural bonded molding sand.

In these nine years, total mineral production value rose \$64,-269,000—from \$542,031,000 in 1951 to \$606,300,000 in 1959.

The second bulletin reports survey results on materials possibly useful as pozzolans. Fourteen samples were taken—of shales, clays and silica—equally divided between the northern and southern parts of the state. In their natural state most showed little pozzolanic activity. But under a chemical test, four were promising.

For the test, samples were airdried and ground in a laboratory hammermill, using a ½-in. screen. A mixture of the sample with a standard solution of sodium hydroxide was heated to 1,300 deg. C. in the presence of lime, and the amount of alkali neutralized. The greater the "reduction in alkalinity," the greater the pozzolanic properties.

Three of the successful samples were taken from southern Illinois: (a) a montmorillonite clay from Olmsted; (b) a kaolin clay from near Anna, and (c) a residual clay from Mermet. The only promising sample from the northern part of the state was a kaolinitic clay from near Hadley.

Please turn to page 61



NORDBAK

Tough, Resilient, Non-Metallic

Here it is! NORDBAK... the manganese backing you pour at "room temperature." You simply mix the contents of two cans together and pour!

Field tests and on-the-job experience show that NORDBAK really works! Because it's resilient and non-shrinking, it provides excellent backing. It's so tough that in a prolonged test the manganese wore through in spots, but NORDBAK remained uncracked. It's easily removed at changeout, too. You can store NORDBAK at your operations . . . get a supply to keep on hand, ready for the next time you replace liners.

Call, wire or write your order for NORDBAK!





NORDBERG MFG. CO.

Enter 1442 on Reader Card

PRODUCTION FACTS ON A

Power Shift Traxcavator



25-SECOND CYCLE TIME! De Bord Bros. of San Antonio have a new 955 Traxcavator excavating and truckloading bank-run gravel. "It averages 25-second cycles; loads a 5-ton truck in 75 seconds with about two and a half bucketfuls. Could handle 40 trucks an hour if necessary." De Bord Bros. watched a Traxcavator completely outperform a competitor in a demonstration... and then made an easy choice: the 955H.

THE HOW AND WHY OF 955 PRODUCTION: 100 HP, 1¾ yd. standard bucket; finger-touch Cat power shift transmission; automatic bucket positioners. Add a competent operator, and you've got perpetual motion of bulk material.

TRAXCAVATORS WORK FAST

POWER SHIFT TRANSMISSION. One lever gives split-second changes in speed or direction to slash cycle time, keep operator fresh and efficient.

LIVE ACTION HYDRAULICS. You get faster lifting and more digging capacity without robbing power from the tracks.

FAST ACTING CONTROLS. Easy to operate. Automatic bucket positioner and lift kickout speed operation. Excellent visibility and safer design improve operator efficiency.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

GET A DEMONSTRATION. See your Caterpillar Dealer for a complete description of the line of front end loaders (track or wheel-type) . . . and a knowledgeable recommendation of the best machine for your job.

CATERPILLAR
Caterpillar, Cat and Transcavoier are Registered Trademants

TRAXCAVATORS
ARE MAKING OTHER
LOADERS OBSOLETE

Industry News

continued from page 59

1960 safety awards from Portland Cement Association

A new record for an accidentfree year—79 member-units—is the proud announcement from Portland Cement Association. And the Thousand-Day Club, whose members hold unterminated runs of more than 1,000 consecutive safe days, totalled 21 at the close of the year.

Nine members received safety trophies for the first time. They are: Columbia Cement Corp., Barberton, Ohio, plant; Giant Portland Cement Co., Harley-

What's coming in August

What's the best way to plan for an increasing annual consumption of aggregates by a growing highway system? West Virginia's answer was an extensive and intensive materials study. State officials think that much confusion, delay and expense on highway work was avoided by availability of this study

ville, S. C.; Ideal Cement Co. plants at Redwood City and San Bautista, Calif., and Tijeras, N. M.; Lehigh Portland Cement Co., Bunnell, Fla., plant; Phoenix Cement Co., Clarksdale, Ariz., plant; Southwestern Portland Cement Co., Odessa, Texas, plant; and Standard Lime & Cement Co., Martinsburg, W. Va., plant.

The Hull, Quebec, plant of Canada Cement Co. Ltd. holds the lead, with 25 trophies and 15 consecutive victories. Other plants in their "twenties" are: the Medusa Portland Cement Co. plant at York, Pa.—24 years; the Alpha Portland Cement Co. plant at Birmingham, Ala.—21 years; and three 20-time winners—Lehigh Portland Cement Co.'s Iola, Kan., and Union Bridge, Md., plants, and Lone Star Cement Corp.'s Bonner Springs, Kan., plant.

Various interesting safety promotions have been underway at member plants during the last months. They include first-aid courses, safety poster contests, free tetanus shots, auto seat-belt promotion, slogan contests, and free safety shoes given for 365 consecutive safe days.

North American Refractories buys Ohio firm

North American Refractories Co., Cleveland, Ohio, has acquired Ironton Fire Brick Co., Ironton, Ohio. By taking over this producer of fire brick, plastics, mortars, cements and other refractory products, in addition to establishing a new plant near Reading, Pa., North American hopes to improve its competitive position.

First Quarter figures some up, some down

The following firms reported a better first quarter in 1961 than in 1960.

	1961	1960
Alpha Portland Cement Co.	\$171,000°	\$472,000*
Marquette Cement Manufacturing Co.	669,618	405,187
Pacific Cement & Aggregates, Inc.	216,898*	223,055*
Permanente Cement Co.	926,000	901,000

And these firms were off during the first three months.

THE ONE THE PROPERTY OF	2021011	
	1961	1960
American Cement Corp. \$ 4	6,307	\$207,456
Basic Incorporated 7	76,752	630,574
New England Lime Co. 7	1,750	144,129
The Ruberoic Co. 11	3.726	473,144

Pettinos completes mergers

At the first of this year, George F. Pettinos, Inc., Philadelphia, Pa., completed the final merging of its remaining American subsidiaries into the parent company. The four interests included Bridgeton Sand Co., Cape May Sand & Gravel Co., Silos, Inc., and A. T. Harris Sand Co.

Please turn to page 62



NORDBAK

It's Simple, Safe and Sure...

It had to happen . . . someone was bound to find a way to end the problems of backing manganese crusher parts with molten metal!

Now . . . you can do it with NORDBAK!

It's mixed at "room temperature" and poured right from a can into the crusher cavities. Gone is the need for special melting and pouring equipment . . . and gone are the hazards of pouring hot metal.

An initial, low cost order to back one set of crusher parts will prove the many advantages of NORDBAK . . . call, write or wire your order today!



NORDBERG MFG. CO.

Milwaukee I. Wisconsin

Industry News

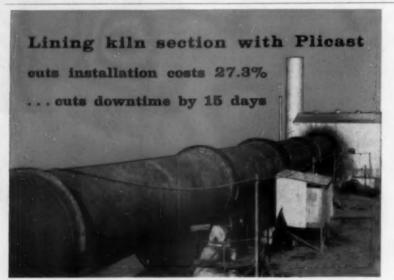
continued from page 61

Lightweight aggregate plant going up in New York

Within a year a new lightweight aggregate plant with an annual capacity of 500,000 cu. yd. will be in production for New York Trap Rock Corp. of Kingston. Located in Ulster, and on the Rondout Creek, the plant will ship most of its output by barge

down the Creek to the Hudson.

The plant will cost in the vicinity of \$2 million, according to President Wilson P. Foss. It will be operated by a subsidiary company, Udell Realty Co., of which Paul M. Hedley is president. Hedley was formerly vice president of North American Cement Corp., New York City.



... AT NORTHERN LIGHTWEIGHT AGGREGATE, INC., COHOES, N. Y.

REPAIR YOUR KILN LINING ECONOMICALLY . . . get back in production fast with Plicast castable refractories. Northern Lightweight did it.

Recently Northern Lightweight relined their entire kiln, using Plicast Tuff-Mix in the pre-bloating zone and Plicast K-L Mix in

the semi-bloating zone. Poured in place, these abrasion resistant castables hugged the steel casing tightly, even where the kiln was out of round. And this monolithic lining is positively anchored, too.

CONSIDER THE ECONOMY . . . in place cost for Plicast in these two zones was 27.3% less than bricking.

CONSIDER THE SPEED . . . placed in 8 days, the Plicast lining saved 15 valuable production days.



CATALOG 73 illustrates Plibrico kiln and dryer applications



PLIBRICO COMPANY

1808 North Kingsbury Street, Chicago 14, Illinois Canadian Plant: New Toronto, Ontario

Sales and Service Throughout the World

1262

Enter 1446 on Reader Card

Articles of incorporation

Construction Aggregates Corp. (Del.) has been incorporated for mining and quarrying. Agent is James R. Farley, 10 S. 10th St., Richmond, Va.; capitalization is \$100,000.

Lake County Aggregates Corp. is incorporated for sand, gravel

What's coming in August

Modern aggregate processing is a much different art than it one or two generations ago. Beginning in August, a 3-part article will discuss the application of metallurgical principles, processes and equipment to preparation of mineral aggregates

and concrete aggregate mining. with capitalization of \$30,000. Agent is William J. Larson, 256 Montgomery St., San Francisco, Calif. Directors are Jack San Biagio, Samuel Charlesworth Paul, Kenneth Joseph Meiring.

Lawrence Quarries, Inc., Lawrence, Kan., has been chartered for rock mining. Paul Robinson is resident agent. Authorized capitalization is \$50,000.

"Hit" film wins interest for Florida firm

A 10-minute feature in color -"A Better Sand . . . Naturally" -attracted quite an audience at the St. Petersburg Home Show for Standard Sand & Silica Co., Davenport, Fla. The film ran continuously as the focal point in the display booth, explaining the mining and processing operations, research procedures and marketing programs.

As an additional gesture, the company is making prints of the film available free to interested groups.

Super sand deposit found near Louisville

A high-quality sand and gravel deposit, believed to be glacial, is yielding rewarding tonnages for Aggregate Services of Jeffersonville (Ind.), Inc. The 100-acre tract is located just across the Ohio River from Louisville, Ky., and the company estimates that it is good for a 10-yr. supply, or 16 million tons of material that is approximately 60 percent gravel and 40 percent sand.

Digging is cheaper than dredging the Ohio River, which has been the principal means of providing aggregates in the area. The deposit is covered with 4 to 5 ft. of dirt; after it is stripped, the sand and gravel are dug to a depth of 30 ft., just above the water table. Eventually, through a pumping operation, the company hopes to be able to dig down to bedrock-another 30 ft. At present, the material is carried to the 250-tph. capacity separating plant by a 500-ft. convevor unit.

Aggregate Services has invested about \$500,000 in land, plant and equipment. During its first year of operation, 1960, it sold approximately 333,000 tons for around \$250,000.

'60 poor year for gypsum

According to U. S. Bureau of Mines statistics, domestic output of crude gypsum for 1960 was 10 percent below 1959, and imports dropped 13 percent. Uncalcined gypsum products sold or used declined 8 percent—from 3,989,366 to 3,659,896 tons. The manufacture of portland cement consumed 69 percent of the 1960 quantity.

Calcined gypsum produced in 1960 was 8,590,763 tons, down 7 percent from 9,268,282 tons in 1959. Plasters for building purposes dropped 11 percent. The output of prefabricated gypsum products was off 8 percent from the previous year. All in all, these figures are just another echo of the general slump in the building industry.

Giant kiln to shrink 19-year waste accumulation

A terrace of spent carbide lime, covering 80 acres and 75 to 80 ft. deep, has been a problem to the Bell's Lane, Ky., plant of Air Reduction Chemical & Carbide Co. since it started to pile up back in 1942. But by the beginning of next year, a kiln 11 ft. in diameter and 220 ft. long will be setting out to restore a 20-year supply of the waste product to lime through heating at the rate of 335 tons a day.

Acetylene gas is the plant's product, with lime and coke being used in seven electric furnaces to produce calcium carbide, from which the gas is generated. Hydrated lime is formed as a byproduct.

The regenerated lime produced by the kiln will be returned to the manufacturing cycle. The company will save money by not having to bring lime down from Missouri, and also hopes the process will at least partially solve the air-pollution problem.

Johns-Manville busy expanding

Johns-Manville Corp., New York, has entered France and Italy as a producer of insulating block and fire brick. Its European activity has grown considerably since the acquisition of the facilities at St. Marcellin, France, and near Milan, Italy.

The company also has undertaken a project to expand openpit mining operations in Jeffrey Mine, Asbestos, Quebec, Canada.

Please turn to page 67



NORDBAK

It's the modern, effective way to back manganese

Non-metallic NORDBAK streamlines crushing operations of every kind. It's as easy to use out in the field as it is in the plant. You mix it and pour it right on the job...wherever your crusher is. No need for special melting or pouring equipment.

NORDBAK fills extremely narrow voids and is only ¼ the weight of metallic backing agents. Conveniently packaged, NORDBAK is the one modern, effective backing agent for manganese crusher parts!

You can use NORDBAK in ALL TYPES of crushers, grinding mills and other machinery where backing agents are required.

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NORDBERG MFG. CO.





NEW IL-30

184 hp 10,500-lb carry capacity 2½- to 6-cu-yd buckets Weight: 28,400 lb

Best power and capacity in its size range

The new Allis-Chalmers TL-30 will give you more production than any other loader in this class. Its modern 11000 turbocharged diesel delivers 184 hp... up to 13 percent more power than others its size. This high-power output is delivered by a combustion system that has established itself as the most efficient in the industry. Proved in other Allis-Chalmers engines, this controlled turbulence, open combustion chamber design, gives you thorough mixing of air and fuel for complete, fast and even combustion... high fuel economy.

When it comes to carry capacity, the new TL-30 sets the pace in the industry. It carries up to 10,500 lb...a big 16-percent bonus over other loaders in this size range. This extra capacity lets you increase material flow...reduce handling costs on every shift.

The new TL-30 also features the same exclusive design and construction advantages in other Allis-Chalmers tractor loaders. Single-lever control; high dumping clearance and long reach; pin-connected axles; 5-way hydraulic filtering protection; safe dump cylinder location and added loader stability are some of the reasons why Allis-Chalmers tractor loaders have received tremendous acceptance by contractors, road builders and public officials around the country . . . in fact, around the world.

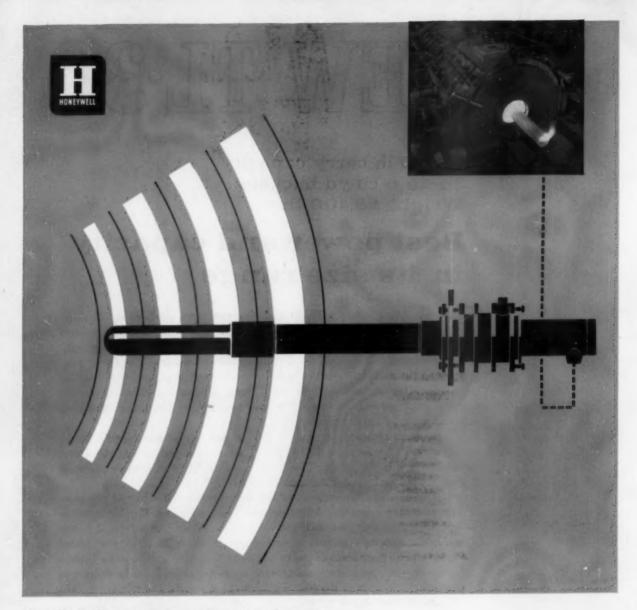
Before you decide on your next loader, make sure you get the complete story on the new TL-30, plus information on the other five tractor loader models—from 77 to 130 hp... 3,600 to 9,000-lb carry capacities. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.



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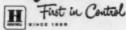
For more than 20 years, Radiamatic Infrared Systems have been giving reliable, accurate service in every area of industrial temperature measurement and control. Over the years, Honeywell has developed special infrared techniques and equipment for a wide range of applications, including soaking pits, kilns, heat treating, induction and forging furnaces.

The key to the high accuracy and low cost of these systems is the Radiamatic Infrared Detector.

Available in many different models with a full line of accessories, these detectors measure temperatures from 200°F. up to 7000°F.

For complete information on how Radiamatic Infrared Systems can solve your temperature measurement and control problems, call your nearby Honeywell field engineer. Or write Minneapolis-Honeywell, Wayne and Windrim Aves., Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

Honeywell



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Industry News

continued from page 63

Field cost accounting outlined in guide

Many rock products men will want to take advantage of the systems presented in a new publication of the Associated General Contractors of America, Inc. The Suggested Guide to Field Cost Accounting can assist them in dealing with contractor customers, and with few adaptations its methods should prove just as useful to our industry.

This guide was drawn up by a special committee of the AGC. Some 80 building contractors provided forms they were currently using, and after these were compared and correlated, composites were drawn up for inclusion in the manual. The procedure is broken down into three parts: preparation of an estimate, using a standard system: job labor and material cost distribution; and the preparation of cost reports so as to provide a realistic picture of the job outcome and accurate data for management and its total financial backing.

Non-members may purchase the guide for \$2.50 from the AGC at 20th and E Streets, N.W., Washington 6, D.C. Members receive it at half price.

Australians demand more cement

Queensland, Australia saw an unprecedented demand for cement during the year ending June 30, 1960. Public works, such as Tully Falls hydro-electric plant and the Tinaroo Dam, consumed much of it, but even after their completion sales continued to boom.

A new plant in Central Queensland is in the planning, which will assist the thriving Northern plant and the expanding Southern plant in meeting construction needs.

END





"Cape Ann" FORGED Steel Drop Balls, manufactured from a tough abrasion resisting steel, are for quarries requiring extra hard usage from a drop ball. Engineered to give long life and better wearing qualities.

Fully Guaranteed! 2000 - 12000 lbs.

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CALENDAR

of coming events

1961

July 20-21, 1961—Expanded Clay and Shale Association, Mid-year Meeting, Americus Hotel, Allentown, Pa.

August 10-12, 1961—National Sand and Gravel Association
—National Ready Mixed Concrete Association, Controllers
Conference, Edgewater Beach Hotel, Chicago, Ill.

August 20-24, 1961—National Sand & Gravel Association and National Ready Mixed Concrete Association, Board of Directors' Semi-Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

September 10-13, 1961—American Mining Congress, Metal Mining & Industrial Minerals Convention, Seattle, Wash.

October 2-3, 1961—Canadian Institue of Mining & Metallurgy and the Society of Mining Engineers of the American Institute of Mining, Metallurgical & Petroleum Engineers, Joint Meeting of Industrial Minerals Divisions, Ottawa, Ontario, Canada

October 4-5, 1961—National Slag Association, Annual Meeting, Pocono Manor Inn, Pocono Manor, Pa.

October 5-6, 1961—National Lime Association, Operating Meeting, Shoreham Hotel, Washington, D.C.

October 16-21, 1961—National Safety Council, Annual Convention, Conrad Hilton Hotel, Chicago, Ill.

1962

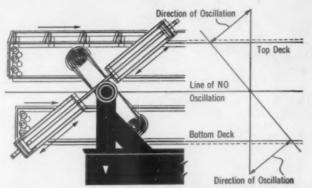
February 4-8, 1962—American Society for Testing Materials, Committee Week, Statler-Hilton Hotel, Dallas, Texas

February 5-9, 1962—National Sand and Gravel Association—National Ready Mixed Concrete Association, 32nd Annual Convention and Biennial Show, Conrad Hilton Hotel, Chicago, Ill.

April 3-5, 1962—American Institute of Electrical Engineers, Cement Industry Technical Conference, Chase Hotel, St. Louis, Mo.

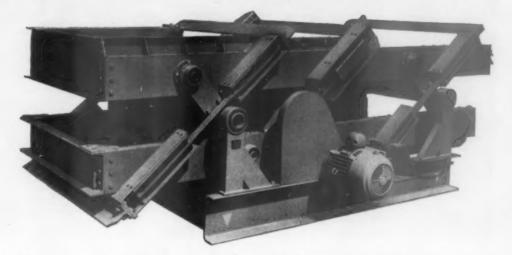
June 24-29, 1962—American Society for Testing Materials, Annual Meeting, Statler Hotel, New York, N.Y.

ROCK PRODUCTS, July, 1961



This illustrates the point-of-NO-oscillation suspension. The screen decks are supported exactly in their center of oscillation—a point of NO oscillation—and therefore transmit no dynamic power to the frame. The screens vibrate vigorously, but the frame stays absolutely still.

THIS HORIZONTAL SCREEN OUTPERFORMS ANY OTHER



No vibratory screen, regardless of type or make, classifies as accurately and economically as Comco's Binder System horizontal screen. There are two solid reasons for this.

- In Comco's exclusive true balanced-mass design, both masses do effective work. There Is No Dead Weight. All other so-called balanced-mass screens vibrate the screen decks against a counter-balance mass that does no work, yet weighs as much or more than the screen decks.
- In Comco's exclusive point-of-NO-oscillation suspension, no dynamic power is transmitted to the frame or supporting structure, requiring no dampeners. The entire screen vibrates vigorously and evenly, with a live action that is not deadened by dampeners, yet The Frame Stays Absolutely Still.

Besides these two exclusive features, Comco screens incorporate other sound principles of modern screen design. An example: metal-bonded rubber Shear Block Springs cut power costs to the bone. Once the screen decks are in motion, these springs keep them oscillating, alternately storing and releasing energy in a natural rhythm that requires almost no additional power from the motor. For all the facts, write for our new Bulletin B-100.

This is a picture of true balanced-mass design: Both decks do effective work. There is no dead weight counter balance. There are no dampeners on the frame.

COMCO

CORPORATION 5421 Lancaster Ave.
Philadelphia 31, Pennsylvania

Rheax System Classification and Dewatering Plants Binder System Vibratory Screens and Conveyors



Heavy-duty scalping...exacting separation of medium fines... Deister Screens handle both jobs at Palmetto Quarries, Columbia, S. C.

One of the South's largest and finest crushed granite plants is operated by Palmetto Quarries Company at Columbia, South Carolina. This plant—together with two smaller Palmetto plants, Stoney Point and Blair—produces almost one million tons of high-grade crushed granite annually.

The granite ledge at Palmetto's Columbia plant consists of hard stone that has been excavated to a depth of 200 feet. In this pit, which covers some 20 acres, is "the hardest-working vibrating screen in the plant"—a Deister scalper.

Every hour, the entire plant load an average of more than 350 tons of stone—feeds from the silo onto this double-deck 5' x 10' Type UHS Deister. Placed in operation five years ago, the scalper is equipped with 2¹/₂" openings on the top deck and 2" openings on the bottom.

From D. K. Corley, Superintendent of all Palmetto Quarries operations, comes this estimate of the Deister scalper's performance: "For five straight years this screen has been working an average of ten hours a day, handling 300 tons an hour or better. In all this time, we have never had a minute's trouble. The only maintenance costs have been for screen cloth."

Another Deister Screen, a double-deck 3' x 10' Type UHS, serves as a scalper at Palmetto's Stoney Point plant. It has 4" openings in the upper deck and 2½" openings in the lower. To meet current demand, this plant is running at full capacity, and the entire plant load of 225 tons per hour goes across the Deister scalper.

Plant Superintendent Charles Scott says: "The load on the screen's top

Superintendent of all Palmetto Quarries operations is D. K. Corley, shown here beside the company's newest Deister Type UHS Screen. Note how the fully enclosed Spring and Rubber Mount suspension system is protected from accumulated stone dust and chips. deck is terrific with a heavy proportion of pieces between 10" and 14" in size. I'm impressed by the way this scalper can take such a beating day after day and still keep working away. We have to replace the 4" screen cloth on the top deck about every two weeks. It's an easy job on the Deister though . . . takes about 30 minutes."

Newest screen at Palmetto is a single-deck 5' x 10' Type UHS Deister handling medium fines. This screen has given uninterrupted service for over a year. Equipped with 1/2" screen cloth, it is doing an exacting job in producing 1/2" material from 3/4" material.

A noteworthy feature of this screen is the Deister suspension system featuring ENCLOSED Spring-&-Rubber MOUNTS. Each mount incorporates a heavy coil spring working in conjunction with a solid rubber isolator to eliminate the transmission of vibration to the supporting structure.

Company President George Lott, Jr. sums up the case for Deister at Palmetto: "Since our first Deister installation in 1956, all the new screens

This is Palmetto's Stoney Point plant, where a double-deck Deister Scalper handles 225 tons per hour to keep production at full capacity.

we have bought have been Deisters. Needless to say we're highly pleased with their accuracy, durability and all-around performance."

Palmetto Quarries is one of hundreds of aggregate plants which are using Deister Screens to boost output and reduce maintenance on every type of job from heavy scalping to production of extreme fines. Deister engineers will be glad to show you how your plant can reap the same benefits.



GEORGE LOTT, JR.

President of Palmetto Quarries Company







HINTS & HELPS

Profit-making ideas developed by operating men





Truck wheels keep rolling

When rims get bent or brake drums get too heavily scored to be reclaimed most truck wheels are ready for the scrap heap. However, many an ingenious mechanic has found new uses for these wheels.

One western producer's plant is well lighted at night, thanks to a dozen or more truck wheels that now support flood lights. A pipe or heavy conduit used as a vertical member is welded to the wheel-base. An elbow at the top takes care of the reflector while a rubber-covered wire is pushed upward through the pipe from the bottom.

The wire is long enough to reach a plug-in outlet in the next unit, but when not in use the wire is coiled up and hung from a bracket on the pipe. Each light standard is heavy enough to stand up in a brisk wind yet light enough to be picked up and transported from one place to another. If more weight is needed in the wheel, concrete can be poured into it or the wheel may be staked to the ground.

Old rims can be used to make cable reels for wire rope, for electrical wire or for air hose. When secured to a structure, the rims are ideal to store long sections of rope, wire or hose out of the way of traffic yet well within reach.

Return idler tips

Sticky material on return idlers is a hazard that most aggregates producers have learned to live with even though they have never learned to like it. There are a number of ingenious ideas which have been developed to combat this detriment to good belt operation.

For many applications, rubbertire return idlers are effective. When they are staggered to prevent tracking in the build-up, they are even more satisfactory. For some difficult materials rods welded to steel return idlers can keep the belt and themselves free from build-up. For other materials, only rubber sleeves secured to the return idlers make a satisfactory solution.

Welding safety



A few simple, common-sense precautions make maintenance welding far safer. First is a safety belt that is secured to a solid structure. This is important, for a fall of even a few feet can be fatal if the welder should slip or lose his balance while working.

A fire extinguisher is an important but frequently overlooked item. If there is any oil, paint, woodwork or fabric near where the welder is working, fires are an ever-present danger—not to mention the danger of the welder igniting his own clothing.

If the welder is working at an elevation, he should have a hand line to raise and lower his equipment. And, naturally, a welder should not be without hard hat, safety glasses and safety shoes.

END





LARGE GRATE AREA AND AGGRESSIVE SCREENING ACTION GIVES UNIVERSAL'S HAMMERMILL SECONDARY CRUSHER EXTRA CAPACITY

Universal has developed a secondary crusher that produces more road rock and/or asphalt mix aggregate per hour at a substantially lower operating cost. There are two keys to Universal's Hammermill Secondary Crusher's Extra capacity:

First, Universal's giant grate area with more grate openings permits the bigger hammers to reduce more rock . . . to discharge freely, rapidly.

Second, Universal's Screenmaster with aggressive screening action provides full screening area on both decks. You get faster more thorough gradation, regardless of the material

being produced. Furthermore, extra-wide conveyors keep the greater production moving rapidly.

Universal offers a wide range of grate combinations with breaker plates designed for close positive control of product. You select from three types of hammers in two or three rows.

Yes, the Universal Hammermill Secondary Crusher has Extra capacity . . . Extra production . . , no congestion or excessive fines.

To see for yourself the Extra dollar benefits of greater production at a lower operating cost, contact your Universal distributor.

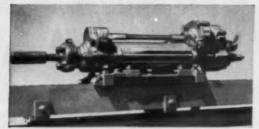


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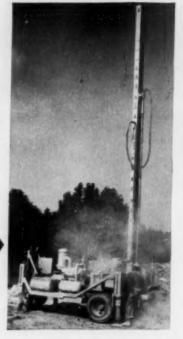
A Subsidiary of Pettibone-Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

GARDNER-DENVER quarry equipment



NEW PR123 POWER-ROTATION ROCK DRILL Provides absolute control—new Gardner-Denver PR123 has independent rotation control . . . variable forward speed, variable reverse speed, plus neutral position. Now driller can select right combination of rotation, drill impact, feed pressure and hole blowing for fastest penetration in any type of rock.

NEW ZEPHYR ROTARY BLAST-HOLE RIG. For fastest drag bit operations—the new Zephyr is a self-propelled, self-contained rig designed for one-man operation. It features 10,000 lbs. pull-down pressure on bit, instantaneous travel control, heavy-duty rotary table with four speed options; and a 200 cfm air package. Track and wheel models. Hole sizes from 134" to 4½".





SWING-BOOM "AIR TRAC"® Most versatile crawler drill available—boom swings in arc of 11'10"... reaches 2½' over both sides of tracks. For horizontal holes, mast reaches 9'6" above floor. Swing-boom "Air Trac" is self-equalizing, self-stabilizing... moves quickly and easily over rough, rocky terrain. Drill rod change to 20'.



■ BROACHING DRILLS. Three heavy-duty models —have interchangeable chucks for drilling and broaching. Drill wet or dry. Feeds available from 7'2" to 13'4". Mounting slide provided with gibs and removable shims.



GRINDERS
Fast,
efficient—
sharpen full
range of
cross and
X-type bits.



DRIFTERS
Automatic and continuous-feed models—bore sizes from 2¾" to 4". Deep hole drills available in bore sizes of 4", 4½" and 5½".

SINKER DRILLS
Speed secondary breakage—five models, 23%" to 234' bore.



AIR FEED LEG DRILLS Lightweight, easy to use two bore sizes, 2½" and 25%".

to help you produce more at less cost



NEW ROTA-SCREW PORTABLE AIR COMPRES-SORS. Reduce maintenance to a trifle-new-type rotary screw compressor has no touching parts in compressor chamber . . . no blades to inspect or replace. It delivers pulsation-free, compressed air flow almost instantly on start-up. Rota-Screw portables operate off level . . . operate in all weather, 40° below to 115° above zero. Three sizes: SP900, 900 cfm; SP600, 600 cfm; SP125, 125 cfm.



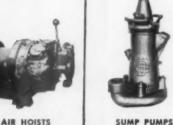
NEW HI-LEED DRILL STEEL. Never before drill steel like this-HI-LEED steel is designed to always uncouple by hand. It combines field-proven reverse buttress design with entirely new thread form that eliminates the wrench.



HT143 CRAWLER ROCK DRILL. Takes a rod change to 30'-Gardner-Denver HT143 carries a hard-hitting, 51/2"-deep hole drill on a heavy-duty drilling mast. It is self-propelled. All controls centralized for ease of operation.











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WHERE DOES THE INTERSTATE HIGHWAY PROGRAM STAND TODAY?*

by Joseph N. Bell

As we go to press (June 22, 1961), Senate and House Committee conferees have reached agreement on the Federal Aid Highway Act of 1961.

The Bill is expected to receive final congressional approval next week, and be sent immediately to the White House. President Kennedy will sign it as a perfunctory

Under Title Two of the double-barreled Bill, the increase in the tax on tread rubber from 3¢ to 5¢ a pound effective July 1, 1961, was approved by the House Ways & Means Committee and the Senate Finance Committee conferees.

The remaining 50 percent of the excise tax income on trucks will not be channeled into the Highway Trust Fund until July 1, 1962, under the agreement of conferees.

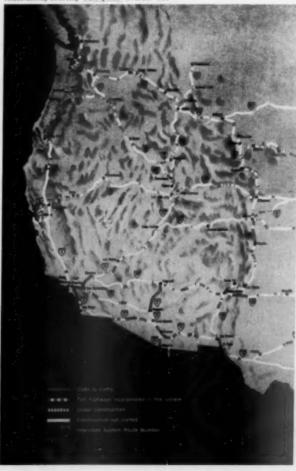
—The Editors

HUNG-UP on the horns of an economic dilemma—that's the position of the highway program, particularly the Interstate System, in the U. S. today. Two widely divergent economic viewpoints must somehow be resolved in one integrated program before the Interstate System can rediscover the impetus that marked its early days.

Listen for a minute to leading spokesmen of these two economic viewpoints. First, Senator Harry Byrd (D-Va.):

"The Highway Trust Fund, until the recent past, was on a pay-as-we-go basis. I am inalterably opposed to any other kind of financing over any extended period. When Congress was requested to increase the federal gasoline tax and divert General Fund revenue to the Highway Trust Fund, it

Illustration, courtesy Caterbillar Tractor Co.



^{*}This is the conclusion of a series of four articles dealing with the Federal-Aid Highway Program. See, also, Part 1, Will Congress resolve money troubles on the interstate system? Part 2, Road program roulette; Part 3, How serious are the highway scandals? in the April, May and June 1961 issues of Rock Products, pp. 80, 95 and 84, respectively

Pay-as-you-go or long-term financing? Those in charge of our country's highway program must settle their differences—or face a frustrating stalemate

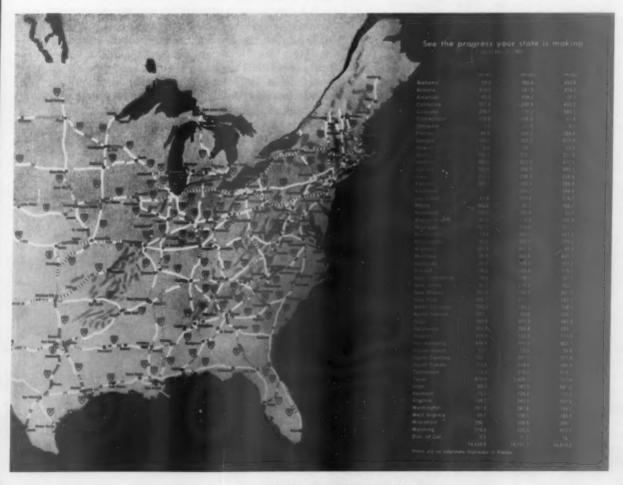
was my duty, as chairman of the Senate Finance Committee, to help steer this bill to passage. I did so reluctantly.

"Even though the tax increases and diversion were for definite, temporary periods, the Trust Fund had already been dealt a blow from which it has not yet fully recovered. In 1958, federal spenders, in the name of recession, abandoned the payas-we-go highway policy and gorged themselves on authorizations and allocations, knowing full well they were exceeding the ability of the Trust Fund to meet the bills. No one involved with the suspension of the pay-as-we-go policy can escape blame for what was done. The Administration approved it. Congress enacted it. States were amenable and let the contracts. Contractors bid on the proposals.

They all knew they were bankrupting the Fund. Not one of our highway programs had ever before been precipitated into such an inexcusable mess."

Congressman Hale Boggs, (D-La.) would agree with the description of present highway financing as a "mess," but would differ sharply with Senator Byrd on the reasons. Congressman Boggs told me in Washington recently that had not the Byrd thinking been superimposed on the original sliding scale Trust Fund idea, it might have worked quite well. "Sure we knew we were in trouble with the Byrd amendment," said Congressman Boggs, "but we had no choice but to accept it because we needed a highway bill. My one interest is to see that the program proceeds as rapidly as possible, and this I plan to do."

Please turn page



ROCK PRODUCTS, July, 1961

Where does the highway program stand today?

continued from page 77

During the recent hearings on the highway program before the House Ways & Means Committee, Congressman Boggs suggested that highway user tax boosts now under consideration constituted a "pay-before-you-go" program, and insisted this was the only conclusion that might be drawn from Federal Highway Administrator Whitton's state-

Quotes & Counter Quotes on Highway Financing

Secretary of the Treasury Douglas Dillon: "Diverting monies from the general fund for highway aid would reduce revenues required for other needs of the government, around which other important programs have been built. This would not solve the problem. It would merely transfer it to another portion of the over-all federal budget."

Edward V. Kiley, director of Research & Transport Economics for the American Trucking Association: "The trucking industry has never cried 'wolf' in hearings on highway tax problems. We are not doing so now; we are in trouble. We are being benefited to death; we can't afford any more benefits."

E. Bristow, president of Bristow Lines, Inc., Richmond, Va.: "In my home state, •I am paying one of the highest total taxes per truck in the country while, at the same time, the federal government has been charging me increased taxes since 1956. Now you are proposing more—for a system of highways that not one of my trucks has ever been on."

overnor Steve McNichols of Colorado (chairman of the National Governors Conference): "We strongly support the President's concept that the financing of the System should be on a pay-as-you-go basis. We see no substantial reason why the people who are receiving the benefit of this newly created System should not undertake the responsibility of paying for it as it comes into being."

John F. Kennedy, President of the United States: "Practically all of the increase in revenues would come from the heavier trucks that use diesel fuel and weigh over 26,000 lb. This is only fair; indeed, technical experts in the Bureau of Public Roads advise me that even this increase would not charge heavy trucks their fair share of the cost of this program."

ment that the benefits of the Interstate System to highway users would not be commensurate with the taxes they would be paying until the later years of the 13-year program.

Faced with a growing highway crisis, the Kennedy Administration has taken a curious position between these two extremes. While paying lip service to the pay-as-you-go idea, the Administration has come up with a request for highway financing that is still essentially stop-gap rather than an integrated, long-term financing approach to the problem. Thus, it is likely to be opposed, in its present form, by both Byrd and Boggs. Combine this opposition with the tremendous pressures being put on Congress by lobbyists both for and against the Kennedy program and the chances of coming up with an immediate workable solution seem remote indeed.

Basically, the three financing alternatives boil down to this.

1. Establishment of a longe-range financing program, built on a realistic estimate of the total cost of the Interstate System, in which there would be a sliding scale increase in user taxes. The interstate construction program would be concluded on schedule in 1972, and there would be an intermediate period of deficit financing which would be balanced in the latter years of the program by tax revenues greater than the roadbuilding needs.

2. Permitting the temporary gas tax increase now in effect to expire this summer, lengthening the present program to a target completion date of 1976, adjusting small inequities in the tax structure but leaving it essentially as it is, and tightening up the efficiency and integrity of the program while paying as it is done.

3. Making some drastic changes in the tax structure based on the recent Dept. of Commerce studies, increasing the rates in some areas to increase total income considerably, using this increased income on a year-to-year, pay-as-you-go basis to speed up construction on the Interstate System with the expectation of completing it on schedule in 1972.

The first position embodies much of the Boggs thinking; the second, Byrd's ideas, and the third seems to be the approach adopted by the Kennedy Administration.

The Kennedy plan embodies these features:

(A) Financing should be accomplished out of highway user taxes and not from Treasury general revenues (in spite of the fact that the Doyle Report recommended that the program be financed partly from general revenues, and one of the Dept. of Commerce studies—still unfinished—will report that about 8 percent of the benefits from the Interstate System accrue to non-highway-users).

(B) Continue the present $4 \neq a$ gal. federal tax on gasoline (due to drop to $3 \neq a$ on July 1, 1961).

(C) Raise to 7¢ a gal. the present 4¢ tax on diesel fuel, scheduled to fall to 3¢ on July 1.

(D) Increase to \$5 from \$1.50 per 1,000 lb. the annual tax on trucks over 26,000 lb. loaded weight.

nnual tax on trucks over 26,000 lb. loaded weighted (E) Increase tax on tires from 8 to 10ϕ a lb.

(F) Increase the 9¢ a lb. tax on inner tubes to 10¢ a lb.

(G) Raise the 3¢ a lb. tax on tread rubber for tire recapping to 10¢.

When these recommendations were made public, the trucking industry, of course, went off like a Roman candle. Edward V. Kiley, representing the American Trucking Association, testified at the highway hearings that the trucking industry "has come to the end of the line." He said it was not a matter of willingness or unwillingness to pay; it was simply that "the industry cannot pay increased taxes at this time." He added: "If the highway program faces an alternative of higher taxes on trucks or a stretchout in the construction program of the Interstate System, then the trucking industry is forced to recommend a stretchout or a cutback. We do this reluctantly; no other course is open to us."

The alternate possibility to increased truck taxes is to jack up the federal gas tax to $41/2 \phi$ per gal. across the board. President Kennedy has opposed this on the grounds that passenger cars already are "paying more than their fair share".



The highway program forges ahead in many areas where contracts are still being worked on at top speed

Table I—Construction components of the work remaining to complete the Interstate System, as of January 1, 1960, amounted to \$26.542 billion not including right-of-way, according to the new cost estimate. This figure, detailed below, does not include amounts needed for construction on 576 miles of the System for which detail location has not yet been established or which are reserved for final measurement. (Amounts in millions of dollars)

The second secon		anadaio or	CONTRA O)
<u>Item</u>	lural	Urban	Total
Grading and misc. work items:			
Grading and drainage \$	5,567	\$ 2,522	\$ 8,089
Utility adjustments	212	405	617
Roadside development	359	101	460
Traffic & pedestrian services	641	564	1,205
Subtotal	6,779	3,592	10,371
Surface and base:			
	1,969	1,429	6,398
	1,057	221	1,278
	5,026	1,650	7,676
Structures:			
26,772 rural structures 3	3,776	-	3,776
11,930 urban structures		4,719	4,719
	3,776	4,719	8,495
Total cost, classified items 16	5,581	9,961	26.542
Right-of-way		3,601	4,673
Total cost, construction & ROW\$17		\$13,562	\$31,215

The grand total above is that which, with some minor adjustments, was broken down by States in the January 13 Newsletter. Work for which contracts had been let or approved for advertising prior to January 1, 1960, is not included

The Dept. of Commerce studies, undertaken as an objective effort to assess highway benefits and thus provide an equitable basis for highway taxation, will support the President's position. Although the final figures are not yet in, preliminary figures indicate that the trucking industry should be picking up a larger share of the tab than it now is. And a number of other vociferous lobbying groups, opposed to the trucking industry, are trumpeting this point.

The Administration and Congress are adrift in a sea of charges and counter-charges through which navigation is daily becoming more difficult. Having been through all this before, most of the legislators tend to accept purely partisan statements at a great deal less than face value. Yet, the problem is very real and very complicated. And no concrete efforts at a solution, acceptable to enough of the disputants to have a chance of becoming law, are yet in sight.

This, unhappily, is the point of basic interest to rock products producers. Although individual producers may differ on what they consider the most equitable means of financing the program, they are united on one point: The need for passing new financing legislation so the nation can get on with the highway program.

Please turn page

Where does the highway program stand today?

continued from page 79

When Bertram D. Tallamy retired as Federal Highway Administrator early this year, he put it this way: "The highway program has always been underfinanced. The facts are that the total cost of completing the Interstate System will be

More **Ouotes & Counter Ouotes** on Highway Financing

Secretary of Commerce Luther Hodges: "Un-less more money is provided by Congress, the 1963 authorizations which should be apportioned to the states in July, 1961, will den-nitely have to be cut below the currently authorized level."

Pederal Highway Administrator Rex Whit-ton: "To complete the Internal Review of the Intern ton: "To complete the Interstate program by the originally scheduled date of 1972, while continuing the ABC program at a slightly increased level, is entirely a matter of providing additional revenue to the Highway Trust Fund. There is ample existing engineering, contractor equipment and materials capacity to handle a program of this size with efficiency, integrity and economy."

Ralph Eisiminger, Hutchinson, Kansas, op-erator of a small trucking business: "I want to tell you for sure that, first, if you put this tax measure into effect, a lot of my employes are going to be hunting jobs because we are going to close our operations down. Second, it might also be that some members of Con-gress will be hunting jobs who did not keep their promise to the taxpayers to vote against any increase in taxes."

H. Bray, Kentucky state highway engi-neer and president of the American Asso-ciation of State Highway Officials: "It is essential that the presently designed Interstate System be completed not later than 1972. The 90-percent contribution of the federal government to the development of the Interstate System was considered by the states as a contractural offer, which the states accepted. We now consider it a commitment and we have planned our state financing for construction and main-tenance accordingly. To reduce the 90 percent would result in a stoppage or a serious in the program in every state. It would defi-nitely make the completion of the Interstate System extremely indefinite."

about \$41 billion, considerably more than was envisioned in 1956. There will be the choice between a stretchout to 1976 and the provision of additional revenue beginning in 1964 to reach the goal in the target year, 1972. The real burden will fall upon the new Congress, whose members will have to solve this important problem. But Congress can't do it alone. The support and understanding of the whole country will be needed."

Ellis Armstrong, president of the Better Highways Information Foundation, expressed essentially the same viewpoint when he said: "Five years ago, Congress drafted a plan to construct a badly needed backbone network of major routes and to help the states upgrade their primary and secondary roads, including urban extensions. Since then, it has repeatedly expressed the intention of continuing this program to reach definite objectives by 1972. We are convinced the average American motorist recognizes the need for road and street improvements and is willing to pay his fair share of the additional money which must be raised. But we must also face up to the fact that the program cannot be completed by 1972 under the existing financial program."

Here, then, is the essence of the problem faced by Congress. Practically everyone favors scheduled completion of the program by 1972, but practically no one is willing to concede that any of the additional funds needed should come from his pocket. In the absence of black magic, Congress is going to have to raise the revenue somewhere. And therein lies the problem.

In such situations, where special interests are represented by loud and expensive lobbying organizations, the general public frequently winds up footing the bill directly. Only the Administration has indicated any strong desire to prevent this from happening, and this stand was considerably watered down by the admission in the President's message on the highway program that increasing the gasoline tax to $4\frac{1}{2}$ ¢ a gal. would be an acceptable solution, but that he would really "prefer not to raise taxes on the general consumer at this time."

All of this raises a fine question about the Dept. of Commerce studies initiated under the Eisenhower Administration and being completed this year. One of these studies-which consumed a good deal of money and some five years of research-was designed to show precisely who benefits from our highways in order that an equitable allocation of taxes might be established. Although not finalized at this writing, the study will show

that the heavy trucking industry should be carrying more of the financial burden than it now is, and that about eight percent of highway benefits accrue to non-highway users. These reputedly impartial studies were made for the guidance of Congress in establishing new highway legislation.

Extreme pressure is being put on individual Congressmen from different directions to ignore both of these findings. The trucking industry is insisting that more taxation is likely to sink the industry; and the Kennedy Administration has stoutly resisted the idea of dipping into general funds for the eight-percent benefit supposedly accruing to non-highway users.

And so it goes. At this writing, no solution is in sight. It can only be hoped that somehow the members of the Ways & Means Committee can cut their way through the labyrinth of charges and counter-charges and extremist viewpoints to some equitable answer to the highway financing problem—and that the Senate won't torpedo the solution, as it did in 1956 with the Byrd Amendment.

In the meantime, construction on the Interstate System proceeds slowly—foundering occasionally on the shoals of the highway scandals that have been erupting and the uncertain financial future of the program. As of the first of the year, the construction component of the work remaining on the Interstate System amounted to \$26.5 billion. Right-of-way costs add another \$4.7 billion, making a total of about \$31.2 billion of work remaining to be done.

Figured on the basis of the revised cost of the System, this means that about one-fourth of the work has been completed in the first five years of the program. A quarter of the total, or about 10,000 miles, are already open to traffic on the Interstate System. In round numbers, more than 5,500 miles have been constructed since July 1956. The remainder represents highways taken into the System, in accordance with the law, which had been completed by the states and toll authorities.

Today, the highway program stands on the brink of what has become a recurring financial crisis. It seems to this reporter that the possibility of a long-range solution—which would probably bring down the wrath of almost all of the special interests involved—is unhappily remote. In the event of another stop-gap solution, we can expect recurring financial crisis in the highway program every few years. This is an expensive and time-consuming way to get the job done, but at least it will get done.

Final apportionment of Federal-Aid Highway Funds authorized for the fiscal year 1962

State	Primary, Secondary, & Urban highways \$925,000,000)	Interstate system (\$2,200,000,000)	Total (\$3,125,000,000
Alabama	\$ 16,025,451	\$ 42,706,125	\$ 58,731,576
Alaska	36,974,837	4 1011001100	36,974,837
Arizona	11,500,478	29,582,438	41,082,916
Arkansas	11,118,245	21,504,656	32,622,901
California	53,493,385	220,070,812	273,564,197
Colorado	13,046,719	16,783,594	29,830,313
Connecticut	7,440,726	26,420,625	33,861,351
Delaware	3,701,521	7,623,000	11,324,521
Florida	18,740,664	56,111,344	74,852,008
Georgia	20,464,451	52,256,531	72,720,982
Hawaii	4,008,681	12,375,000	16,383,681
Idaho	8,026,698	14,942,813	22,969,511
Illinois	36,640,489	111,053,250	147,693,739
Indiana	20,010,553	62,456,625	82,467,178
Iowa	17,642,109	20,551,781	38,193,890
Kansas	17,051,886	19,382,344	36,434,230
Kentucky	13,790,279	38,071,688	51,861,967
Louisiana	13,451,741	57,194,156	70,645,897
Maine	5,744,242	11,131,313	16,875,555
Maryland	9,860,457	48,791,531	58,651,988
Massachusetts	14,378,440	60,312,656	74,691,096
Michigan	31,152,920	85,109,062	116,261,982
Minnesota	21.691.836	40.822.031	62,513,867
Mississippi	13,256,699	23,778,563	37,035,262
Missouri	22,036,316	61,785,281	83,821,597
Montana	12,640,267	24,623,156	37.263,423
Nebraska	13,344,241	13,361,906	26,706,147
Nevada	8,091,028	11,326,219	19,417,247
New Hampshire	4,045,939	11,910,938	15,956,877
New Jersey	16,579,668	70,079,625	86,659,293
New Mexico	11,432,033	25,944,188	37,376,221
New Mexico	49,984,444	107,263,406	157,247,850
North Carolina	20,108,246	11,737,688	31,845,934
North Dakota	8,888,006	9,593,719	18,481,725
Ohio	33,663,652	141,068,812	174,732,464
Oklahoma	15,561,825	19,685,531	35,247,356
Oregon	12,214,735	37,530,281	49,745,016
Pennsylvania	36,860,731	88,314,187	125,174,918
Rhode Island	4,503,961	10,091,813	14,595,774
South Carolina	11,568,140	17,844,750	29,412,890
South Dakota	9,917,881	9,182,250	19,100,131
Tennessee	16,516,493	64,232,437	80,748,930
Texas	50,437,591	97,842,937	148,280,528
Jtah	8,702,538	20,248,594	28,951,132
ermont	3,499,701	20,421,844	23,921,545
irginia	16,525,848	91,757,531	108,283,379
Washington	13,775,110	39,219,469	52,994,579
West Virginia	8,123,460	27,135,281	35,258,741
Visconsin	18,987,193	22,804,031	41,791,224
Vyoming	7,655,455	22,500,844	30,156,299
Dist. of Col	4,520,198	21,461,344	25,981,542
uerto Rico	5,685,629		5,685,629

The rock industries will be watching Congress wrestle with this problem over the summer with a great deal of interest. The fate of the highway program is in their hands. It can only be hoped that our Representatives and Senators can weigh these divergent points of view and arrive at a solution that will provide the American public with the roads it needs, wants and is willing to pay for.



82

High-speed shipping systems pour out torrents of limestone from Standard Industries' revamped crushing-screening setup at Tulsa

Surge piles displace stockpiles

by Elwood Meschter

STOCKPILES OF FINISHED MATERIALS have been virtually eliminated from the layout of Standard Industries' redesigned layout near Tulsa, Okla. Instead of a multitude of individual stockpiles, three huge surge piles of crushed limestone take their place. Two of these piles are made up of semi-finished limestone, ready for screening, blending and shipping through the "dry" end of the plant. The third pile of raw material holds as much as 50,000 tons of minus 9-in. rock. It backs up the two smaller surge piles and, at the same time, is the primary surge for an aggregates scrubbing setup.

This bold approach to high-speed production has paid off handsomely for the company's \$500,000 investment in new screens, washing equipment and complex blending conveyors. The two surge piles make it possible to make, blend and ship as many as seven aggregate specifications.

Prime advantage of the system has been to overcome a rock products producer's prime headaches—to avoid making and stockpiling unwanted sizes of aggregates when shipping big tonnages of one particular size. Standard Industries' ingenious layout still has not completely solved the problem, for some sized material still must be hauled or conveyed back to one of the two surge

LITTERITURE

A pair of big three-deck secondary screens (left) prepare material for the big surge piles (far left and right)

Surge piles displace stockpiles

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piles to be recycled through the system. Oversize can be recrushed and screened to saleable sizes, but excess fines must go to dead storage piles.

Of course, the three big surge piles still have the advantages common to conventional surge piles. As long as there is material in the surge piles, segments of the plant can operate independently of the quarry or other parts of the plant.

There are two separate shipping systems at this completely modernized aggregates plant. One is a relatively simple 300-tph. washing setup to put scrubbed limestone into rail cars. This is primarily to provide the huge tonnages of aggregates for the Keystone and Eufala dams now under construction near Tulsa.

The other is a much more complex 900-tph. system that take care of Standard's big business in dry aggregates shipped by truck throughout eastern Oklahoma. Here, accurate blending and high-speed truck dispatching are equally important. Seven trucks and a rail car can be loaded simultaneously. Here's how it is done:

One surge pile stores $2\frac{1}{2}$ x $\frac{3}{4}$ -in. limestone, the other $\frac{3}{4}$ x 4-mesh. Either or both can be tapped to supply the range of sizes needed to maintain material in the shipping silos. A conveyor under each pile puts the raw aggregates on an inclined belt conveyor leading to a battery of four production screens. These vibrating screens are mounted above a group of eight 200-ton, concrete-stave blending silos. Each silo holds a primary size of aggregate that will later become a part of a blend of material.

Blending is achieved with the remote automatic operation of an apron feeder under each silo. Each feeder discharges to a belt conveyor that runs down the centerline of the group of silos to pick up aggregates. Since the speed of each feeder can be individually controlled, the operator can make an almost infinitely wide range of blends. The blended rock ends up in one of seven 100-ton truck-loading bins, placed there finally by a shuttle conveyor running along the top of the bins.

An alternative arrangement permits the stream of blended stone to be diverted to a rail car loading station. A pair of double-deck vibrating screens at this point permits dedusting or rinsing before the final boom conveyor puts the aggregates into gondola cars.

A recycle loop permits each surge pile to send its material through a crushing and rescreening system, and the new products split between the two piles. A feeder under each puts crushed stone on a conveyor that takes it to a 22 x 40-in. three-roll crusher. Crushed rock then goes back to the secondary screens that made the original cut of the flow of material in the two surge piles. The newly sized material is then redistributed to the piles and the fines are either discarded or sent to one of two of the blending silos.

Another recycle loop starts at the blending silos. Here, sized aggregates can be put on a belt conveyor system to be returned to the three-roll crusher, recycled through the secondary screens and ending up back on the surge piles.

The scrubbing system gains much of its flexi-



The blending and shipping system at a glance—at left are the production screens above the blending silos; truck loading setup at right, and rail loading in the background



A single operator controls the eight apron feeders under the blending silos

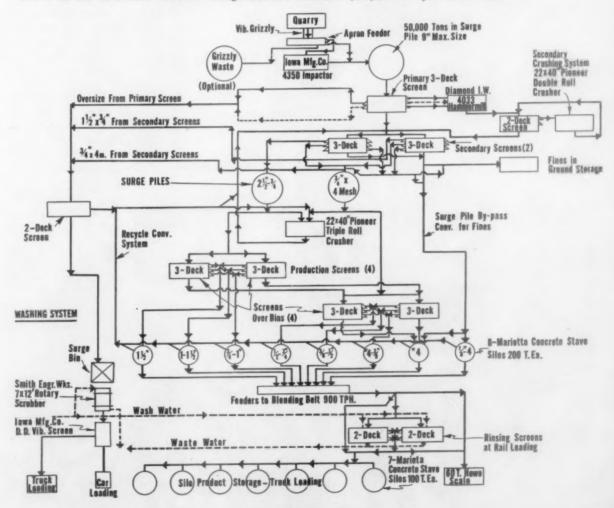
bility by its ability to draw from the two surge piles supplying the dry system as well as from the primary surge pile. However, for normal operation the surge piles serve the purpose of receiving unwanted fractions and excess material from the secondary screens that make the aggregates for dam construction.

It is also possible for the washing system to take aggregates directly from the primary surge pile. These have been sized by the primary screen with undersize going on to the secondary screens and oversize processed in a crushing and screening loop. Two sizes of aggregates are usually shipped through the washing setup, $1\frac{1}{2}$ x $\frac{3}{4}$ in. and $\frac{3}{4}$ x 4-mesh.

A crushing and screening system at the primary surge pile takes care of oversize from the primary vibrating screen. A 40 x 33-in. hammermill discharges to a two-deck vibrating screen. This screen, in turn, sends through-screen rock to the two secondary screens. Oversize goes to a 22 x 40-in. double-roll crusher and is recycled back to the screen.

The two secondary screens govern the range of sizes going to the washing system or to the two surge piles for the dry aggregates system described above. Each screen splits the flow of material and each has three decks. These six decks give the operator an almost unlimited flexibility to control the range of sizes going to either sys-

This is the flow of crushed limestone through Standard Industries' \$500,000 new layout east of Tulsa



Surge piles displace stockpiles

continued from page 85

tem. All fines are taken out of the system at this point to be stockpiled or to be sent directly to the blending bins, bypassing the surge piles.

Heart of the washing system is a 7 x 12-ft. rotary scrubber. Both conveyors bringing sized aggregates discharge into a small steel surge bin. This is fitted with a belt feeder to draw rock into the scrubber at a uniform rate. The action of the drum with its water sprays scrubs and tumbles the rock. Then a horizontal, double-deck vibrating screen with a battery of spray nozzles rinses and



Scrubbing is done in a 7 x 12-ft, drum followed by a rinsing screen



Both surge piles can feed this triple-roll crusher

dewaters the aggregates as they go to the conveyor leading to the rail cars.

Standard Industries' quarry is tooled for efficient, high-speed operation to put limestone into the primary surge pile at better than 750 tph. The deposit is a high-calcium, low-silica formation that ranges up to 100 ft. deep. A small amount of overburden is stripped and hauled away, and the top 6 feet of the formation is drilled, blasted and removed.

Blasting is done about every 4 days when 100 to 130 holes filled with ammonium nitrate are set off. A high-speed drill puts down 3-in. diam. holes on an 8 x 11-ft. pattern. The drill averages about 100 ft. per hr. in this formation—a big improvement over older drill rigs. The 4-prong bit is sharpened after every 100 ft. of drilling.

Blasted rock is loaded out with a pair of $2\frac{1}{2}$ -cu. yd. shovels and is hauled to the primary crusher in one of five 15-ton trucks. The 43 x 50-in. impeller crusher takes only the oversize from a small vibrating grizzly that is fed with a heavy-duty apron feeder. Through-grizzly fines drop to the foot end of the inclined belt conveyor that takes all limestone out of the quarry to the primary surge pile.

For normal operation of the crusher, the fines are usually $1\frac{1}{2} \times 0$ and go to the surge pile along with crushed rock. It is possible to divert fines to a stockpile in the quarry and haul them away by truck.

Even though Standard Industries has solved its major production problems it has ambitious plans for improving efficiency even more.

MAJOR EQUIPMENT REFERENCE

MANAGE ENGOTE METER I	JACAN TOL
Quarry drill	. Northwest Engr. Co.
Trucks, 18-ton (5)	
Apron feeder Vibrating grizzly Impactor, 43 x 50-in. Washing screen, dd.	lowa Mfg. Co.
Vibrating screens, (10) Conveyor idlers	Hewitt-Robins Inc.
Vibrating screen (1) Triple roll crusher, 40 x 22-in. Double roll crusher, 40 x 22-in.	Pioneer Engr. Works
Hammermill, 40 x 33-in,	nond Iron Works Div.
Concrete stave silos (14)	
Belt feeder drives (8)	. Master Electric Div.
Conveyor belts	
Conveyor idlers	Joy Mfg. Co.
Washing drum, 7 x 12-ft.	Smith Engr. Works
Conveyor design Concrete work Plant construction	

Huge crane delivers the goods

With the help of reactor control, the nation's longest overhead crane handles 450 tph. of cement clinker at Dundee Cement Co., Dundee, Mich.

A GIANT CRANE is busy transporting 3,400 tons of cement clinker every day at Dundee Cement Co., Dundee, Mich. The 630-ton unit is the longest-span overhead crane ever built in the United States and it extends 150 ft. across the 330-ft. long storage hall of Dundee's huge \$26 million plant. Stepped-up speed and capacity, as well as a genuinely unique design, enable the single crane to take over work normally assigned to two. Considerable savings are realized in labor costs, electricity and maintenance, but the setup has been in operation too short a time to accurately chart costs. Then, too, it is a custom installation; the many additional variables add to the complexity of tabulating savings.

A capacity of 450 tph. and an 80 sec. round-trip duty cycle is achieved with a 6-cu. yd. bucket, hoist speed of 300 fpm., trolley speed of 350 fpm. and bridge speed of 450 fpm. These speeds are essential to keep up with the plant's annual production of more than 6 million bbl. of clinker.

Twin 60-ton box girders enclose and protect the electrical controls, thus eliminating the usual control house. A closed-circuit air circulation system goes a long way to prevent abrasive clinker dust from ruining the complex equipment.

Generally, the only cranes equipped with ac. reactor control are those requiring precision spot-Please turn to page 118



Dundee Cement Co.'s 330-ft. long cement clinker storage hall is spanned by the nation's longest overhead crane, a 315-ton unit with a 6-cu. yd. bucket



This is the \$26 million plant of Dundee Cement Co.



Clinker spills from the bucket of the giant crane. Two 60ton box girders, containing electrical control equipment, extend to two 4-wheel trucks which support the crane on rails at the outer edge of the clinker hall



Aggregates production at dams—

Part 1:

New techniques

born on

early jobs

by Walter B. Lenhart

Dam builders were among the first to test out new theories of aggregates processing, to improve quality and strength of concrete. They helped to pioneer the use of many types of equipment that had been used in other industries. This series of articles, of which this is the first, will discuss some of the history of dam construction in the U.S., and will point out methods of processing concrete aggregates in connection therewith

-The Editors

Left: Dam construction gave opportunity for practical testing of new theories in aggregate processing

A HISTORY OF AGGREGATES PRODUCTION at the nation's larger concrete dams is virtually a history of the entire rock products industries. On the early jobs, dam builders developed new processes and gave first trials to many types of equipment that had been used in other industries. New theories of processing aggregates, to improve quality and strength of concrete, got their first practical workout at dam jobs. Many have been discarded, but some of the theories, processes and equipment types are in common usage in the industry today.

In retrospect, concrete dam building, the start of the highway building program, even the beginning of industrial life as we now know it, could be said to have begun when portland cement concrete first found wide acceptance in all phases of our economy.

The metal mining industry gave us many of the tools we use in aggregates processing today. The modern crushers—jaw, gyratory and cone—are children of the metal miner. Screens, belt conveyors, sand drags, rake dewaterers and dewatering spirals are likewise off-shoots of the hard rock miner. Only in the last decade or two has the rock products producer, with emphasis on aggregate production, begun to develop tools of his own.

Such experience is similar to that the industry enjoyed on large concrete dam work, and to a greater extent on dirt-fill dams. Low-cost, high-tonnage, dirt-moving equipment developed for the rock products industries and highway building made it possible to build dirt-fill dams cheaper, but not better, than good concrete structures.

But now we have an ironical situation: the trend in dam building is away from concrete and toward dirt-fill. The resulting loss in tonnage of aggregates and portland cement runs into millions of dollars annually. Another trend in dam building further aggravates the loss in tonnage. All types of dams are being built higher and thinner. If of concrete, there is a tendency to use less portland cement per cubic yard with each new venture.

By dirt-fill dams we include in this discussion dams called "zoned dirt-fill," "impervious cored dams," "rock faced dams" and all types of dams except steel, wood, masonry and concrete.

Dam builders, at the turn of the century, contributed some new ideas in aggregate production and amplified and enlarged older ideas. The first stone ladder described in ROCK PRODUCTS was used at a dam. The first field belt conveyors used

on a giant scale, unequaled at any rock plant, were at a dam. Rod mills for grinding excess sizes to concrete sand were first used at a plant supplying aggregates for a dam. Where, but on a dam job, would a 7-million-ton stockpile of finished material be found? The highest rated hourly capacity of an aggregates plant—2,500 tph.—was at a dam. Heavy Media Separation for treating a sand fraction was and still is in use at a dam.

Much of the development of the portable washing and screening plants can be traced to the needs of the dam builder. Sand classification, sand blending and sand-pile drainage systems are direct off-shoots of the dam era. Probably one of the first complete and modern (at the time) installations used to recover gold from sand and gravel was at a dam.

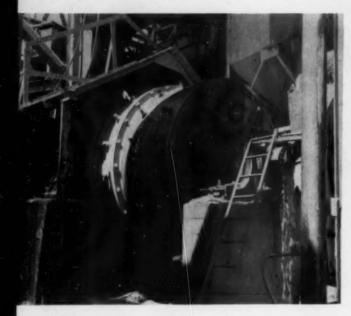
The theory of thermal incompatibility was a hook, during the 1940's, on which concrete experts

Please turn page

Table 1—Some construction materials used in U. S. dams

Name	Dates Built	Cement Used per Cu. Yd.
Buffalo Bill	1905-10	5
East Park	1909-10	4 sacks
Roosevelt	1905-11	Cyclopean; masonry 3.04; concrete and mortar, 6.00
Arrowrock	1911-15	55% portland cement; 45% pulverized granite for ex terior ground at damsite; 90% minus 200 mesh; 3.8 for interior; 4.20 exterior; cyclopean concrete; 66% cement, 34% pulverized granite for exterior
Elephant Butte	1911-16	52% portland cement clinker; 48% pulverized sandstone, ground at damsite to 90% minus 200 mesh. Internal: 4.00; External: 5.6. Cyclo- pean concrete
Gerber	1924-25	5.12
Gibson	1926-29	4.12, plus, 1% to 3% diato-
0100011	2,20 2	maceous earth
Deadwood	1929-31	5.52, plus 3% diatomaceous earth
Oyhee	1928-32	4.00
Hoover	1931-36	4.08
Parker	1935-38	4.36
Semino	1936-39	4.00
Bartlet	1936-39	4.96 to 5.48
Grand Coulee	1933-42	4.00
Marshall Ford	1937-42	3.95 to 4.28
Friant	1939-42	25% pumicite; cement
Shasta	1939-45	4.00
Altus	1941-45	4.16, exterior; 2.72, interior
Hungry Horse		3.00 cement plus 1 bag fly ash
Pine Flat	1954	3.00 cement, no additive
Glen Canyon	Under	2.30 cement plus a natural
Olen Callyon	construction	pozzolan
Ice Harbor	Under	
Ice Harbor	construction	2.00 cement at start, later raised to 2.50

Aggregates production at dams . . . continued from page 89



The ball mill proved to be an efficient concrete sand maker at Baker Dam plant

hung their hopes for better concrete. The theory, now more or less forgotten, meant that the sand should have the same mineralogical content as the coarse aggregates. Thus, the sand had to be "manufactured" in rod mills or similar equipment, and dam builders using crushed stone found rod mills standard equipment at their plants.

Similarly, the theory of "aggregate reactivity" led to unusual practices. All the minus 2-in. gravel was rejected at one dam job. Sand and the minus 2-in. aggregates had to be hauled in from an out-of-state source (freight \$3.77 per ton), or it had to be manufactured from the coarse aggregates. On the plains of the Dakotas stands a debris pile containing millions of tons of gravel. It's a modern pyramid that some day man will look at and wonder what has been done to cope with a theory.

We tried to find out who built the first concrete dam in the United States. The answers we got ranged all the way from the Romans to the beaver. Lacking more definite information, we had to settle for the first concrete dam built west of the Mississippi River—Buffalo Bill dam on the Shoshone River near Cody, Wyo. It was built in 1905-1910 by the Bureau of Reclamation, and modifications to it were made in 1915 and in 1922-1923. It was a small dam, 325 ft. high, 108 ft. thick at the base, and had a crest length of only 200 ft.

Concrete for the dam totaled 75,242 cubic yards.

Data on aggregates production are lacking, except (quote): "Crushed rock from required excavation and prepared sand. Maximum size 2.5 in. for 75 percent of volume, oversize for 25 percent."

The dam was of the arch type, using cyclopean concrete. (The first few concrete dams built in the U. S. used this type of construction, i.e. large blocks of rock often weighing up to 10 tons were laid in the mass of the dam. Spalls and concrete filled the vertical joints, with concrete mortar as bedding.)

A closer look at dam history reveals that Bear Valley dam (Calif.) was a masonry arch dam completed in 1884. It was only 64 ft. high. Crytal Springs dam (Calif.) was the first to use interlocking concrete blocks. It was built during the 1890 to 1911 period, was 154 ft. high and contained 157,000 cu. yd. of concrete. Its late completion puts it out of the running as a genuine "first." Tallahassee dam (Fla.), completed in 1900, was said to be the first to use concrete grouting, and Ambursen dam (Theresa, N. Y., 1905) was the first slab and buttress concrete dam to be built in the United States.

Mining practices in the 1905 era were crude, though we have no accurate information on those practices at Buffalo Bill dam. Mules and horses pulled wagons with dump boards, which were hand operated. A hand shovel was the digging tool. The screen was simply a piece of wire cloth nailed to a frame, about 3 ft. x 8 ft. in size, which sat along some stream bank. Angle of the screen was about 50 deg. to horizontal.

In operation, a laborer simply shoveled the pit material onto the stationary screen. The through product was sand. The over product, after hand picking oversize, roots and river debris, was the gravel. Material was not washed in any fashion. Once a load was thus processed, the same laborer shoveled the sand, or the gravel, into the wagon.

Early dams used "aggregates from the river bed" or "excavated material with river sand" as concrete aggregates. Use of cyclopean concrete was a favored practice. Cooling of the concrete was "natural."

Concrete dams built prior to Hoover (1931 to 1936) had tough competition from dirt-fill dams, as they do now. The aggregates project that supplied Hoover dam (Boulder) probably was the first to study production of aggregates on a vast scale, and to use techniques that even today would be considered modern.

The Corps of Engineers, U. S. Army, have been

building dams for a long time. One of their first projects was a dam on the outlet to Lake Drummond (Virginia), which was completed in 1825. Their first reservoir is listed as the Winnibigoshish Reservoir in Minnesota, a Mississippi river navigation project. Earlier dam and reservoir projects under their control were mostly dirt-fill structures. The Corps of Engineers has been engaged in river and harbor projects for navigation since 1824.

Dam projects of the Corps may be divided into two classes: (1) Those engineered and built for others, such as Wilson dam (Tennessee river), completed in 1925 for the Tennessee Valley Authority; and (2) those engineered, built and operated by the Corps. This latter phase of their varied activities was a "late comer," since their first concrete dam was Tygert, at Grafton, W. Va. It was followed by Conchas dam in New Mexico (1935), and by Dover in Ohio (1935-1937).

The Bureau of Reclamation and the Corps of Engineers vie with each other in the West to build dams on the same river, and/or drainage area. Some might consider this a waste by duplication, but others observe that the competition is healthy. It tends to provide for better and safer structures. Duplication could be illustrated by Grand Coulee (Columbia river), a Bureau of Reclamation job. Immediately below it is Chief Joseph, a Corps of Engineers undertaking. Army projects on the same river are: McNary, the Dalles, Bonneville, John Day and Ice Harbor on a tributary (Snake River). In California, in the Sacramento-San Joaquin river drainage area, Shasta and Friant dams are Bureau of Reclamation jobs. Pine Flat dam is a Corps of Engineers project.

The Bureau, during the period 1953-1960, built some 38 dirt-fill dams and 8 concrete dams. Hungry Horse, Folsom, and Glen Canyon (under construction) dams are of the latter type. Reconnaissance and design work on these dams date back many years. During this period the Bureau built a steel dam, a wood-faced dam, a concrete-faced dirt-fill dam, and an asphalt-faced dam. A high official with the Bureau told the writer that concrete dams were too expensive, and in a search for a cheaper type of dam they were going to build an asphalt one. An old concrete dam in Oregon is being buried in dirt, and its height is being increased some 81 feet. A reservoir in California recently was made with the use of plastic sheets.

The trend toward the use of less portland cement per cubic yard started in the early 1940's, except for Elephant Butte and Arrowrock dams. To-

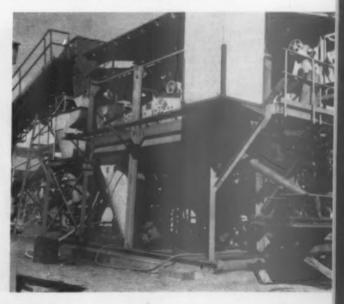
day, concrete technologists are thinking in terms of two bags per cubic yard, which is about one-half of what their predecessors used. Here's how a concrete technologist on a federally sponsored dam explained this trend: "There are many of our engineers who think the best concrete is that without any cement in it at all."

Table I gives a list of dams, showing the date of construction and the amount of portland cement used per cubic yard of concrete.

The so-called thin-arch dam, essentially an importation from Europe, is one result of the search for more economical dams. One, now under construction in north Italy, will be 865 ft. high and only 66 ft. thick at the base. (This compares with our Hoover dam, which is 726 ft. high, but 660 ft. thick at the base.) One of these thin-arch dams, the thinnest for its height of any concrete dam ever built, is Malpasset dam in France. It failed about a year ago, taking more than 300 lives.

Additives in the form of pozzolanic agents were used quite early. Diatomaceous earth in proportions of 1 to 3 percent was used in a few early dams. Pumicite was used at another. With two exceptions, early concrete dams built by the Bureau of Reclamation used at least four sacks of portland cement per cubic yard of concrete. The cement content was not much below four bags, even when additives were used (see Table I). Please turn page

Heavy media separation used for the first time to process a sand fraction at Glen Canyon Dam plant



Aggregates production at dams . . . continued from page 91

The two exceptions deserve special attention: Elephant Butte on the Rio Grande river, and Arrowrock in Idaho. Elephant Butte used 52 percent cement clinker, plus 48 percent sandstone. Both were ground in the same mill at the same time to about 90 percent minus 200 mesh. Similarly, granite for Arrowrock dam was ground with the portland cement, using 55 percent cement and 45 percent granite. Both dams were of cyclopean concrete, using plumbs of rock up to 10 tons. The large aggregate may account for a small part of the low cement usage, since it represents about one-half the amount used in later concrete dams.

Pozzolan additives in more recent dam structures are used to replace portland cement. The pozzolan normally is added at the mixer. Fly ash was used on Hungry Horse dam for about 90 percent of the job, but the top 30 to 40 ft. of the dam were finished without fly ash.

The principle of grinding clinker with the additive is believed to be a favorable one. Contrariwise, that of adding it at the mixer is believed to be not favorable. The difference in the two procedures can be explained partly by (1) better and intimate mixing, and (2) by the little-understood scientific possibility of the Chemistry of Communition.

In a sense, cyclopean concrete can require less cement than normal when based on amount used per cubic yard. The theory that the larger the aggregate used (assuming equivalent blending of smaller sizes), the less portland cement can be used, is fairly well established. This becomes obvious if we take an extreme case of two pieces of solid granite, each containing ½ cu. yd. and each with one face relatively smooth. Spread ¼ in. of mortar over the face and set together. The result is 1 cu. yd. of cyclopean concrete with probably not more than one-fourth of a sack of cement.

Early small dams appear to have used natural cooling. Continuous fog sprays were used occasionally, along with night pouring. Hoover dam was the first Bureau of Reclamation job to use metal pipes embedded in concrete for cooling purposes. More than 500 miles of pipe were used on that job. Grand Coulee used 2,300 miles of such pipe through which river water circulated. Marshall Ford and Shasta dams used refrigerated water during hot weather. The use of cooling pipe was virtually abandoned at dams built during the 1940's and 1950's because of the expense involved. Instead, standard practice changed to the use of ice water, chipped ice in the mix, and dunking coarse aggregates in ice water. According to reports, some dams (location possibly abroad) circulated ice water through coils of metal pipe placed on top of the concrete. That method of cooling may not be too efficient, since pours or "lifts" gradually are increasing from a few feet to as many as 7 ft. in thickness.

Succeeding chapters will give the highlights of aggregates production at important dams built in the United States.

Belt conveyors stocked three sand sizes at Hungry Horse Dam project. All were then blended into a single product



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ROCK PRODUCTS, July, 1961

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Rocklite celebrates 20th birthday

by John H. Bergstrom

A PIONEER in expanded shale production, Rocklite Products has developed over 20 years into a 5-kiln operation turning out over 800 cubic yards per day of its special brand of lightweight aggregate.

During Rocklite's growth, its home city of Ventura, Calif., has done some expanding too. To-day, the once isolated plant is surrounded by a residential area. In smog-conscious Southern California this meant the installation of a highly efficient dust collecting system.

The result of careful study and experimentation with a number of dust collection methods is a dry process incorporating two stages: a 5 x 30-ft. cyclone to remove the largest volume of coarse dust, followed by a 120-tube collector for each kiln. The tube collectors trap particles as fine as 450-mesh. Tests show the system to be over 95 percent effective.

Collected dust is transported through a piping system to a silo by a pneumatic conveyor. From the silo, the dust is wet loaded with a screw conveyor and trucked to a dump. However, there appears to be an opportunity to develop a commercial application for this material which amounts to about 70 cu. yd. per day. One possibility currently

Above: Big plant with 5 kilns produces 800 yd. of light-weight aggregates per day

Center: Raw material is ripped and dozed over a cliff to stockpile from a quarry 400 ft. above the plant

Below: Coarse dust collection is made in a 5 x 30-ft. cyclone on each kiln

being explored by Rocklite management is use as a filler in paints and insecticides.

If plant efficiency is measured on the basis of tons per production man hour, Rocklite stacks up with the best of them. National production figures show an average of about 2.0 tons per production man-hour. Rocklite exceeds 2.3 tons per production man-hour.

Although the plant has changed, the material is the same as when first introduced in 1940. Rocklite is brown in color, round, with a smooth hard surface. The interior of each particle is a mass of tiny independent cells. The chemical composition is as follows:

Alumina			9		0	0				0		0		.23.60%
Silica		0		0	0				0	0		0	0	.61.80%
Calcium Oxide														. 2.60%
Ferric Oxide	*							*			*			. 2.90%
Magnesia													*	. 2.80%
Sodium Oxide														. 3.90%
Potassium Oxide														. 1.63%

The four basic sizes of Rocklite with weights per cubic foot are as follows:

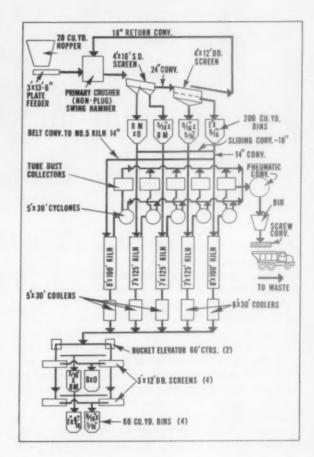
Passing Retained 1-in.		Weight
		41 lb.
9 in.	$\frac{5}{16}$ -in.	45 lb.
$\frac{5}{16}$ -in.	8-mesh	55 lb.
8-mesh	0	63 lb.

Rocklite's round shape and vitreous outer skin also endow it with other desirable properties. Workability is far better than concrete made with angular crushed material. It has exceptional bonding properties with portland cement, since the cement paste remains coated on the sealed outer surface where it is used to maximum efficiency. A structural range from 1,500 to 5,000 psi. with conventional cement factors is readily obtainable in concrete weighing less than 100 lb. per sq. ft. Concrete made from Rocklite is low in absorption and has exceptionally low curing shrinkage. As an insulator it has a "K" factor of 2.0.

The soft, light blue shale used to produce Rocklite is quarried from three benches rising as high as 400 ft. above the plant. Material is loosened with a back ripper and dozed over a cliff to a stockpile near the primary crusher. Once a day the dozer moves the feed to convenient locations for the stationary dragline that supplies the primary feed hopper.

Please turn to page 117

Expanded aggregate collected from coolers goes by bucket elevator to final sizing screens. The latter are mounted over four 600-cu. yd. bunkers in building at rear





Huge "rooms," measuring thousands of square feet, can go to waste when limestone quarrying comes to a halt. Here's how one producer is profitably turning the space into storage dollars . . .

Once an underground mine now a modern warehouse

Cashing in on the spacious caverns left after underground quarrying operations is proving most worthwhile for several limestone producers who have turned them into profitable warehouses.

Among the most enterprising is Joseph J. Griesemer, Griesemer Stone Co., Springfield, Mo. Mr. Griesemer began strip mining operations on Burlington limestone strata in southwest Missouri in 1946. Eight years later he moved operations underground when strip mining became costly, because of clay overburden, and dangerous when blasting, due to the location's proximity to U. S. Highway 66.

At the present, approximately 130,000 sq. ft. of storage area are in use, and an additional 110.

000 sq. ft. are under construction. The Griesemer Stone Co. leases the space to Security Terminal, Inc., of which Mr. Griesemer is president. Security Terminal then leases the space to the tenant, developing it to suit his specifications.

Minimum construction—minimum maintenance are key assets of underground storage space. Ninety-sq. ft. limestone pillars have been left, with 50 ft. of space between them. Ceilings are approximately 26 ft. high. The drainage system consists of 3,000 ft. of underfloor pipe and 1 ft. of porous stone rockfill under the 6-in. concrete floor, which slopes .8 ft. in 133 ft. A perforated drainage pipe extends around the edges of the three rooms.

Humidity is readily controlled by a system

Please turn to page 98

576 feet of railroad track carry boxcars to convenient locations approximately 25 ft. from storage rooms in Security Terminal's underground warehouses at Springfield, Mo.





"Now our customers are saying 'send one of those automatic jobs'"

Reports James A. Nicholson, owner of Toledo's Nicholson Concrete Co.

Come up with a new wrinkle or revolution for the ready-mix industry and you'll be quick to catch the interest of Toledo's James A. Nicholson. "We've been guinea pigs for years for new equipment and when we heard about fully automatic transmissions, we went out and bought a pair of Powermatic-equipped Chevies," he says.

And now he owns eight trucks equipped with fully automatic transmissions — looks forward to the day when "our whole fleet will have nothing but trucks with automatics."

A talk with Assistant General Manager B. J. Wagner will quickly show you why:

"We can figure on at least two or three new customers every year just because we've got these automatic drives...

"In the kind of jobs our trucks have to do, we'd be snapping rear ends right and left if it weren't for that automatic transmission...

"Sand's our biggest headache but those automatics can 'walk in and out' of 18 inches of sand without any trouble."

Drivers, too, like the automatics—so much so, in fact, that the prize in Nicholson's "keep your truck clean" driver competition is assignment to an automatic-transmission truck.

Mr. Nicholson sums it all up: "As far as our industry is concerned, the automatic transmission is as revolutionary as the development of the pneumatic tire."

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Once an underground mine . . .

continued from page 96

which takes in 10,000 cu. ft. of air per min., filters it through silica gel, heats it by natural gas, dries it and combines it with an equal amount of air from the storage area. The temperature is usually kept at 70 deg., with humidity from 40 to 60 percent. Percent of humidity can be regulated through automatic control valves.

Light bulbs are actually the major maintenance expense in this type of warehouse; weather factors and general deterioration are hardly to be considered. For maximum lighting, walls are covered with a coat of white portland cement and hydrated lime. An auxiliary set of battery-powered lights is available in case the outside source of electricity fails.

Unlimited floor load capacity is another strong point in favor of the underground warehouse. In addition, all-weather loading and unloading is made possible by railroad tracks penetrating 576 ft. into the warehouse. The railroad granted permission to build the loading dock with a space from 4 to 6 in. between it and the boxcars. This means that boxcars are easily unloaded at floor level by fork lift approximately 25 ft. from doors to storage rooms. All goods coming into the warehouse are stacked on wooden pallets about 4 ft. square, completely handled by fork lift.

Outside facilities are provided for unloading eight trucks at one time. Six docks adjust automatically to truck bed height. A ramp leads from the truck load to the dock. It is also possible to drive a truck into the storage rooms.

The fire hazard is practically eliminated, as seen by the fact that Security Terminal's underground warehouse has been promised the lowest fire insurance rate in Missouri. The entire area has an extra-duty sprinkler system, including fire hoses. The inside dock area has a standard wet sprinkler system. Its 200,000-gal. water tank is fed by a lake created by the earlier quarry operation.

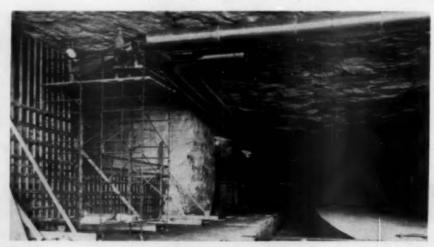
Standard reinforced concrete fire walls separate the three storage rooms. In addition, automatic fire doors connect the rooms with each other and with the inside loading dock area. If the heat rises to 130 deg., the fire doors close and the sprinkler system starts. A warning light in the dock superintendent's office indicates excessive heat in any specific location.

Few employes are needed, when compared to the roster needed to staff a multifloored, above-ground warehouse. Security Terminal employs an average of five full-time and five part-time employes. As an example of the system's efficiency, one man with a fork lift can unload an entire boxcar of palletized material and store it within one hour.

In addition to these many benefits, which are typical of underground warehouses in general, the Griesemer operation has exceptionally advantageous transportation. It is on major U. S. Highway 66, which runs through Springfield, and near U. S. Interstate 44 (east and west) and U. S. Highway 65 (north and south). A 4,125-ft. spur has been built to the entrance of the warehouse by the St. Louis-San Francisco Railway.

It is easy to see the promise in the development of underground warehouse space, not only for the warehouser but as additional income for rock products producers.

Because the ware-house is 50 ft. underground, a humidity control system is of prime importance. Here, workmen install pipe for the system. At left is a scaffolding on which will be built a reinforced concrete fire wall



98



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A "beefed up" part will probably last longer simply because there is more metal to wear away. But, consider a jaw crusher. Heavier, larger parts impose strains that bearings and framing members were not designed to take. A heavier jaw means a restricted opening that actually cuts production.

Amsco works with original equipment builders to design parts that make the entire machine operate as it was designed to do. In addition to manganese steel (12-14% manganese), special alloys have been developed to meet your specific needs, such as, chrome-moly steels, multiple alloy engineering steels and high chromium and nickel iron.

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How to get *better*additives control for finish mills

by Norman C. Ludwig & L. M. O'Hara*

WATER, grinding aids and air-entraining additives going into cement grinding mills can now be controlled automatically. This is achieved by controlling one pump from the voltages taken from three separate mill feed motor tachometers.

Our relatively complex system went into successful operation over a year ago at the modern Harbor plant at Gary, Ind.

Accurate proportioning is essential to all grinding mills and this need stimulated the study that brought about this innovation. We hoped also that liquid in the form of finely divided sprays could be introduced into the mills, and a method devised to change liquid flow rates in relation to mill feed rates. Elimination of effort in calibrating and maintenance were factors that would reflect themselves in lower operating costs.

Our finish grinding system consists of three 11 x 17-ft. 1,000-hp. mills close-circuited with three 16-ft. air separators and fed by dc. drag chain feeders with dc. motors.

Cement clinker and gypsum are proportioned by means of belt weighing devices and conveyed to mill hoppers. The variable-speed drag chain feeders convey the mixture from the discharge spout of the hoppers to the sloped mill feed spout. Discharge from the mill is carried by an elevator and air slide to the feed entrance of the air separator. Tailings from the separator are returned to the mill feed spout and the fines are transported to storage silos as finished cement.

Three liquids, added singly or in combination, are used in the grinding operation. They are (1) water, (2) an aqueous solution of a grinding air and (3) an aqueous solution of an air-entraining agent. Direct addition to the mill by spray nozzles results in faster, more thorough blending of the chemical liquid additives and more rapid water evaporation. However, sometimes the liquids are added to the mill feed directly in front of the mill.

Of course, the primary purpose of adding water is to cool cement to less than 140 deg. F. before it reaches the storage silos. But it also cools the mill and its contents, prevents gypsum dehydration and increases the loss on ignition of the cement.

Grinding aids—in dilute solutions for better control—assist grinding in ball or tube mills by minimizing ball coating and by dispersing the ground material.

Air-entraining agents—also added in dilute solutions—promote the formation of very small, stable air bubbles in the liquid phase of the cement after addition of aggregates and water.

These three liquids vary considerably in the precision required for proportioning them. The water need not be closely controlled. The grinding aid requires closer watch—mainly because it costs money. The product is not harmed by some variation. But the air-entraining agent is costly and, as proper air content is essential, it is important to keep this within limits.

The proportioning system consists of a control panel, duplex pump unit, auxiliary valves, switches and spray nozzles, as well as wiring and piping arranged as shown in Fig. 1. Voltages from the three feeder drive motor tachometers are connected in series to control the outputs of two absolute volume, diaphragm-type proportioning pumps. These pumps are connected to two headers located close to the feed end of the grinding mills. The liquids are introduced into the mills by separate lines (Fig. 1a) which connect the headers to spray nozzles located in the feed yokes of the mills.

Attached to the shaft of each motor of drag chain feeders is a permanent magnet tachometer

^{*}Mr. Ludwig is Manager-Manufacturing Research, and Mr. O'Hara is Manufacturing Research Engineer, at Universal Atlas Cement Division of United States Steel Corporation, Gary, Indiana

An ingenious arrangement of control equipment yields better cement for Universal Atlas

generator which, in each case, is connected to a voltmeter calibrated in 0 to 100 percent speed. Precision resistances of 33,000 and 10 ohms are connected across each tachometer generator, as shown. Speeds of the feeders for normal operation of the mills range from about 25 to 40 percent speed, depending upon the fineness of the cement being ground. Tachometer voltage at 25 percent speed is 35.1, and that at 40 percent speed is 54.2. The voltages appearing across the 10-ohm resistors for these limiting speeds are:

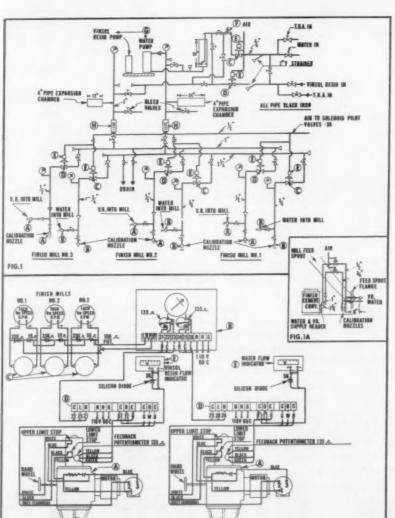
For 25 percent speed:

Volt = 35.1 (10/33,010) = .0106 or 10.6 mv. For 40 percent speed:

Volt = 54.2 (10/33,010) = .0164 or 16.4 mv.The 10-ohm resistors are connected in series. Hence, the sum of these voltages appears across the calibrating potentiometer of 100 ohms. In the case of 25 percent speed, this sum would be 31.8 mv. and, for 40 percent speed, this sum is 49.2 mv.

The feed rate recorder is a potentiometric recorder of range 0 to 50 mv. Its scale is calibrated

Please turn page



WWP STROKE POSITIONERS

FIG. 2

Fig. 1-Valve and piping diagram for feeding water and additives to three cement grinding mills. Key:

-Spray nozzle, Cat. No. 1/8" G3004-

S.S., Spraying Systems Co. B—Spray nozzle, Cat. No. \%" G3307,

Spraying Systems Co.

No. C414, size '4" valve, Sinclair-

C-No. C414, \$126 % valve, Sincialr-Collins Valve Co.

D-No. C415, size % "valve, Sinclair-Collins Valve Co.

E-No. LC-43-01 solenoid air pilot valve, Valvair Corp.

F-Type No. 227, range 2-60 psi., size % "regulating valve, Mason-Neilan Divisies" Division

-Model CPD-2-3XX duplex pulsa-

feeder, Lapp Insulator Co., Inc.

H—No. 5159B, cracking press. 17-33
psi. relief valve, Circle Seal Relief
Co., Incorporated

Fig. 1a-Typical detail of the piping at each mill

Fig. 2-Wiring diagram of the electrical control circuit. Key:

A-Model D-62XW electric actuator potentiometer feedback, Conoflow Corp. (Drawing SK-3752)
B-No. 142X13-V11-111-11 feed rate recorder V.R. & H₂O controller, Brown Instrument Co.

Brown Instrument Co.
C—Permanent magnet tachometer generator on feed drag chain drive motor, General Electric Co.
D—No. 353306—3 water proportional relay, Brown Instrument Co.
E—No. 105X11-V water flow indicator, Brown Instrument Co.

Brown Instrument Co.

How to get better additives control . . .

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An instrument on a control panel for each mill records production, and indicators show the amount of additives going in

in 0 to 500 bbl. per hr. grinding rate. The finish mills at the Harbor plant are ordinarily used to grind four different cements (with and without grinding aids and air-entraining agents) to four different finenesses. From several years experience, the approximate points of adjustment of the feed rates to these mills in developing required finenesses have been learned, and the average production per mill established.

The drag chain feeders are frequently calibrated for different speeds as measured by a revolution counter on the drive pulley. The linearity of this type of feeder is good. Ordinarily the calibration does not change more than about plus or minus 4 percent from high to low operating mill feed rates. The mixture of cement clinker and gypsum is a dry material which usually flows freely from hoppers. Means for detecting erratic feeder operation are provided in the feeder and elevator control circuits.

Insofar as possible, balance is always maintained between the three mills. This is accomplished by equal circulating loads and feed rates. The necessary adjustments required in ball loading, air separator settings and other changes are duplicated. Production data derived from the feeder calibrations show that the mills grind at almost equal rates.

At the beginning of a grind, the grinderman adjusts the drag chain feeder speeds to give the estimated rate and then adjusts the potentiometer

so that the recorder will read the estimated total production for the three mills. The latter adjustment is not critical as the pump control circuit is arranged so that the outputs of the pumps will change linearly to the signal received by the recorder. When the grinderman receives fineness reports from the plant laboratory, he alters the feeder speeds and separator settings as needed to maintain a constant fineness. The recorder provides a record of these changes and downtime.

The two proportioning pumps are diaphragmtype, absolute volume with rated capacities of 50.6 and 132.0 gph. The smaller pump is usually used for adding the grinding aid and air-entraining solutions and the larger one for adding water. However, as will be detailed, the piping is arranged to provide for pumping any one of these liquids through either pump. Pump output is controlled by changing the stroke of an oil immersed piston in the pump housing by means of motor driven positioners.

As shown in Fig. 2, these positioners are connected to proportional relays and flow indicators. The two proportional relays are also connected to the two recorder control slide wires. The relays were modified by removing the proportional band adjustment. The reason for this is that, in this particular process, 100 percent correction with fairly fast response was considered desirable in all cases. Rate of response is not critical, because the feed rates to the mills remain fairly constant unless they are changed manually. The number of pumps which can be controlled from a single recorder depends on the number of control slide wires it is

be as many as five or six. Differences in instantaneous voltages from the contact arms of the instrument slide wire and positioner slide wire are impressed on the amplifier in the proportioning relay. The amplifier energizes

possible to install on the recorder shaft. This may

Please turn to page 106

Fig. 3-The flow of a liquid through a nozzle discharging to the atmosphere can be expressed by the formula:

$$Q = AV = AC \sqrt{2g} H$$

where Q = volume in ft.3 per sec.

= area of orifice in ft.2

= fluid velocity in ft. per sec. C = nozzle constant

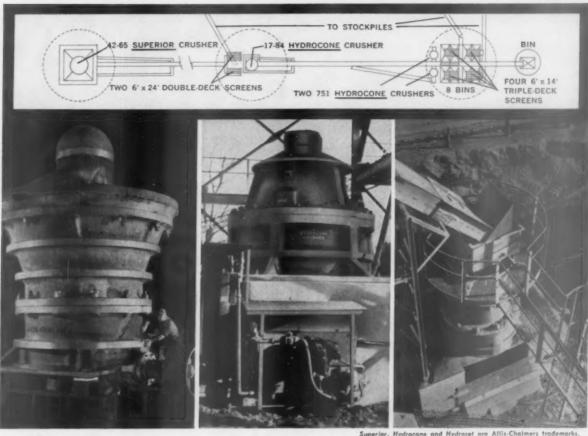
= acceleration of gravity in ft. per sec.² = pressure drop over nozzle in ft. of water (i.e., nozzle gage pressure x 2.31)

From this, the following relationship is obtained:

$$\mathbf{Q}_1 \div \mathbf{Q}_2 = (\mathbf{H}_1 \div \mathbf{H}_2)^{1/2}$$

ALLIS-CHALMERS





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Ask your A-C representative about the rugged flexibility of A-C crushers equipped with Hydroset control. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. A-1336



Hammer Mill





Jaw Crushe



Grinding Mill



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How to get better additives control . . .

continued from page 104

small RH and RL relays and causes the positioner motor, in turn, to bring the positioner slide wire contact arm back to a point of zero potential difference. A reset adjustment is provided as a means of changing the relative positions of the arms of the two slide wires. Thereby the pumps are adjusted to give different flow rates for the same signal received from the mill tachometers.

The flow indicators are dc. millivoltmeters of the D'Arsonval type and are calibrated in gal. per hr. These are connected through calibrating resistors and silicon rectifiers to the positioner slide wire.

Water and either of the solutions may be pumped by either or both pumps by manipulation of the manually operated valves.

Diaphragm-type valves with electric air actuators are placed in the two supply lines to the pumps and in the six spray nozzle lines connecting the spray nozzles to the headers. Push-button stations and signal lights for these valves are mounted on the mill control panel.

Liquid is supplied to either pump through the manually operated valves (set according to choice of liquid), two master shut-off electrically operated valves and two "Y" strainers. Water, supplied by the plant water line, is reduced in pressure by use of a 2 to 60 psi, reducing valves. This, with the downstream relief valves, insures that the pump downstream pressure will always be greater than the supply pressure, a condition needed for proper functioning of the pump check valves. A 4 x 24-in. surge tank is placed in the supply line to the larger 132-gph. pump. This acts as a reservoir to supply liquid to the diaphragm cavity required during its suction pulse. Because of its size, the 50.6-gph. pump does not require a surge tank reservoir.

The output sides of the pumps are connected to separate identical systems, each consisting of an expansion chamber, 17 to 33 psi. relief valve, a header running the full width of the three grinding mills in front of the mills, and three separate spray lines running from the header to the spray nozzles. The reason for using expansion chambers

Table I—Calibration Data: Millivolts received by recorder from each mill tachometer

	Mill !	No. 1	Mill	No. 2	Mill	No. 3
Tachometer vm. readings*				40		40
mv. signal received by recorder						400

^{*}Mill drag chain motor tachometer voltmeter is calibrated in rpm. of range 0 to 100



This is a complete pumping assembly showing surge tank and expansion chambers mounted in front of the pumps

is that the pumps pump with short, high-pressure pulses and these act as cushions to level out the flow through the system. In each of the spray lines is an electrically operated valve, mill spray nozzle, calibration spray nozzle and manually operated valves for turning the two spray nozzles on and off. A pressure gauge is also included in the spray lines to indicate nozzle plugging.

The Pump A (50.6 gph.) nozzles are supplied through a 1-in. standard pipe header, and the three Pump B (132 gph.) nozzles are supplied through a 1½-in. standard pipe header. The spray lines from the headers to the nozzles are identical in pipe size, length, type and number of inserted components. For equal flow rates, the pressure drops across these spray lines are essentially equal. Hence, if a constant pressure is maintained across the length of the header, equal flow rates will be obtained at the three or more nozzles.

The nozzles are selected so that the pressure drop over them will maintain a minimum header pressure of about 20 psi. The header is sized so that the pressure drop due to friction between spray line connection points is a maximum of about 3/4 psi. at 1/3 full pump capacity. Then the ratio of flows would be as derived in Fig. 3:

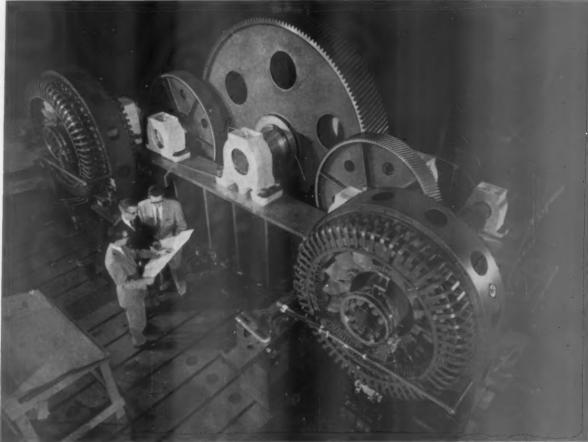
$$Q_1 \div Q_2 = [(20 - .75) \div 20]^{\frac{1}{2}} = .9625^{\frac{1}{2}} = .981$$

Hence, it is seen that, under these limiting conditions, the nozzles at the ends of the header would deliver only about 2 percent less liquid than

Please turn to page 108

ALLIS-CHALMERS





Twinducer is an Allis-Chalmers trademark

Full-load demonstration proves 98%-plus efficiency of <u>Twinducer</u> grinding mill drive

New, twin-motor drive system divides mill load electrically, saves space and installation costs, extends gear-train life.

To show the high efficiency of the Twinducer drive, Allis-Chalmers engineers recently conducted a series of full-load demonstrations at the factory.

Full load was simulated by coupling two *Twinducer* drives. Driver unit was coupled to driven unit. Load on driven unit was two equally loaded generators.

Power input to the motors was measured, and compared with the output of the generators. Efficiencies (exclusive of ordinary motor and generator power losses) were found to range from 98.48% to 98.52% ... more than twice the efficiency of most conventional mill drives.

The Twinducer drive balances the load electrically, through a unique, angular rotor shift of one motor. Result is a drive arrangement that takes less space than other trunnion drives... and facilitates automation of grinding equipment. Twinducer drive cuts maintenance costs, conserves power requirements and greatly extends gear-train life.

For complete information on the new Twinducer drive system, see your A-C representative. Or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

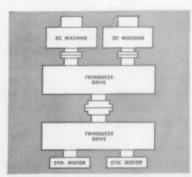


Diagram of Twinducer drive demonstration. Load is balanced electrically by a rotor shift mechanism in one of the twin synchronous drive motors. A-1514

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How to get better additives control . . .

continued from page 106



Electric actuators are mounted on top of the pumps supplying water or additives to the mills

the central nozzle. From a design standpoint, nozzles and pipes to meet the above requirements can be selected without difficulty from readily available stock.

The calibration data are set down in two parts:
(a) voltage signal received by recorder from each mill tachometer and (b) flow vs. flow meter readings for each pump.

(a) Millivolts received by the recorder from each feeder motor tachometer were obtained by operating each mill separately and measuring the millivolts at the terminals of the recorder by means of a portable potentiometer. Tachometer readings of 25 and 40 volts with corresponding millivolt signals are reported. These tachometer readings cover the operating range of feed rates for all the cements ground at the Harbor plant mill. Millivolts divided by scale division shown in Table I give values ranging from .400 to .428. These values show that essentially the same signal is received by the recorder over the 25 to 40 operating range from each mill tachometer. Hence, no adjustments in calibration of the tachometer voltmeters were made.

(b) Flow calibration data were obtained by allowing the pumps to pump water through the spray nozzles at different rates and collecting the water in containers for periods of time ranging from 4 to 20 min. The containers were weighed by means of a laboratory beam balance, and the flows

were calculated in terms of cc. per min. and gal. per hr. It has been found preferable to use cc. per min., as this quantity can be calibrated quickly with a graduated cylinder. The data show that the flows from the individual nozzles for both pumps are essentially equal. In this parallel system, in which the finished cement from the three separators goes into a common conveyor, where it is blended, it is not necessary to maintain absolutely equal flows in all three mills.

This equipment has been used since July 1959 on the following finish cement grinds (AE denotes air-entraining and GA grinding aid):

Type I Cement—Water only

Type IA Cement-Water plus AE Solution

Type III Cement-Water only

Mortar Cement-Water plus AE Solution

Type IS Cement-Water only

Type IS Cement-Water and GA Solution

Type IS-A Cement-GA and AE Solutions

Type III Cement—Water plus GA Solution

For 6 months following start-up, the grinds were watched closely for air content and, with varying water additions, the temperatures of the cement leaving the mills. On a number of occasions, the drop in liquid level in the GA solution and AE solution tanks were compared with the liquid volume calculated from the flow settings. These data showed that the system performed consistently and maintained the original calibration. An an operating procedure, it was found necessary to wash out residues of the liquid additives and clean the "Y" strainers in the pump supply lines after each grind in which these were used.

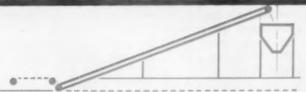
Maintenance has been minor and consisted of replacing one diaphragm valve electric actuator and one positioner slide wire.

Sufficient experience has been obtained with this equipment to show that it accurately feeds liquids to cement grinding mills. Operation of three separate spray nozzles from one common header has demonstrated that equal flows can be obtained from the individual nozzles by use of proper pipe and nozzle sizes.

The methods and equipment enumerated here can be revised to operate with different numbers of mills supplying a greater or lesser number of liquids—using either manual or automatic positioning control. Since the pumps will operate with a suction head up to about 20 ft. of water, there is no need for an overhead storage tank. Savings can thus be realized in new installations.

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Lime industry eyes new markets

Some of lime's present markets
are growing; some
are declining.
Research to find
new markets
gets the spotlight

THE GREAT NEED of the U.S. lime industry today is research to find brand new uses for lime in areas that promise a big growth potential. This need is highlighted by the fact that the industry for the past few years has been characterized by fluidity and change. Some of lime's old markets continue to grow, but volume in others is sliding.

Industry activity that is directed toward solution of the problem was presented at the annual meeting of the National Lime Association, which was held May 11-13 at Point Clear, Ala. The program was built around discussion of methods used to look for new markets and research already underway to accent the growth of present markets. The 3-day meeting produced this major observation: the lime industry is highly conscious of its major general problems and is seriously probing every possible avenue of solution.



Our micrographs show that lime causes a chemical bonding action between grains in soil . . . —James Eades

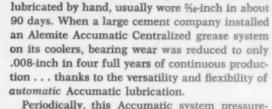
3-yr. program of research to find out what happened when lime is added to clay has just been completed. James L. Eades, NLA Research Fellow at the University of Illinois, has been doing the important work. The final purpose of the work, according to Mr. Eades, was to formulate a simple test for use by field men. The closest he has come to a test he likes is based on his research that shows solubility of silica increases rapidly at a soil pH of 9 or above. He suggests that NLA make available to State highway people, County engineers, etc., a small kit containing all measured-out materials to check the pH of soil. The idea is to add lime in measured amounts to raise the pH to 11 or 12, then it would be possible to determine how much it would cost to treat the soil. Mr. Eades called this idea a "cookbook" method.

First research in this area showed that a reaction of adding lime to soil involved an ion exchange on clays. After testing many soil samples, he found that a chemical analysis showed the presence of calcium carbonates as well as calcium silicates, and the latter is what he wished to show in a reaction. Then he made some thin sections, or micrographs, which revealed that a 2-percent mixture of lime does cause a chemical bonding of grains in the soil. From that he developed the silica solubility and pH relationship, and from that the suggested simple test.

There are still many questions that have not been answered through research already performed, but he did find out what he started to prove—that silicates are formed when lime is added to soils. Please turn to page 112

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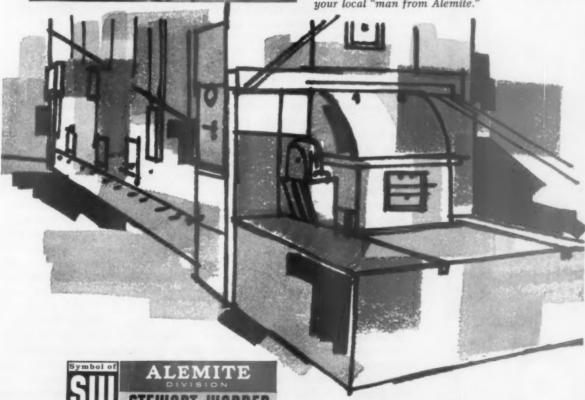
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In Canada: Stewart-Warner Corporation of Canada, Ltd., Belleville, Ontario

National Lime Association meeting report

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Two new markets are looming here as possibilities for increased sales. Described by Ken Gutschick, NLA Technical Services Manager, they are asphalt paving and railroad subgrade stabilization. The association, through Mr. Gutschick, has made two new movies to publicize these developments, one on each type of project. Both movies were shown at the meeting.

Lime in asphalt was pioneered in Colorado, where many deposits contain plastic aggregates. Lime has proved to be especially adaptable to these materials, permitting local materials to be used with resulting savings in cost. Use of lime in asphalt allows use of more asphalt in the mix without loss of stability. Lime plus higher asphalt content means greater waterproofing, less stripping and less swell. And it only requires 1-2 percent of lime.

The railroad subgrade stabilization job, described by Mr. Gutschick, was in Texas. It involved a 4-mile single-track spur and a 5-track storage area that are to serve an industrial plant. The problem was poor local materials, since the spur had to cross the typical black gumbo clay rice lands in the Gulf coastal area. Instead of using the normal 12-in. layer of mud shell to support the ballast and track, an 8-in. layer of in-place clay-lime stabilization was substituted. Savings are estimated at 40 percent. Also, the use of lime is believed to have aided the contractor in meeting his construction deadline, when there was doubt that it could be made.



We've crossbred cement and lime and got a strong product . . . —Elmer Wodetzky

High-pressure steam-cured sand-lime-silica products should have an excellent future in this country, according to Elmer Wodetzky of Massapequa, N.Y. Poreen concrete, which has been developed and used in Germany to a high degree, is just being introduced on this continent. It is, according to the Poreen Research Society in Germany, a new type of concrete product that uses lower amounts of bonding material (half the cement content replaced with lime) to give "physical values considerably higher than the best traditional concrete and at less cost."

Here are some of the qualities of Poreen concrete, listed by Wodetzky: less shrinkage; high early strength; absence of lime in the end product; acid, frost, abrasion and sulphate resistant; crack free, and low cost. With regard to cost, as compared with materials used in normal concrete, those used in Poreen to make 8,000 slabs or block a day, 200 days per year, would save \$35,000 annually. A new Poreen concrete plant will be ready to produce in New Jersey next Fall.

Sand-lime brick, too, should have a better market here than it enjoys. In Germany, annual consumption of lime in the manufacture of masonry materials rose from 383,000 tons in 1950 to 1,133,000 tons in 1959. Only about 30,000 tons are used annually for that purpose in this country. And two-thirds of that are reported to consist of carbide lime, a waste product.

Steady success in the sand-lime field has been enjoyed by John Wheeler, Cobo Materials Ltd., Toronto, Ont., Canada. But he is virtually the only manufacturer on this continent to show good results. In commenting on Mr. Wodetzky's paper, Mr. Wheeler noted that Russia has made more progress in the use of lime than has Germany. He stated that $2\frac{1}{2}$ million tons of quick lime have gone into Russia's structural building program. "NLA has a responsibility to industry and to the public," Mr. Wheeler summed up, "to research for increased use of lime."

NLA has a responsibility to industry and to the public to research for increased use of lime . . . —John Wheeler

Research is what made the sand-lime brick industry grow in Germany, according to Dr. Herman Lange, Hohenlimburger Kalwerke, Hohenlimburg, Germany, and also president of the German Lime Association since 1946. It started with a research project between the association and the sand-lime brick industry. Now, both are cooperating on the installation of a pilot plant. Results are expected to further improve an expanding lime industry in that country.

Researching the researchers, to find out every possible future use for lime, is a brand new approach NLA is using to seek out new growth potentials for lime use. Dr. Locke White, Jr. of Southern Research Institute heads up a 1½-yr. program of research in this area for NLA. He is contracting researchers in all industries, learning of their industry research programs and trying to see where lime use could fit in. He's hitting these three broad areas: (1) markets where lime is now used, (2) where substitutes for lime are being used and (3) brand new uses, where lime is not now used. Results to date? They're nothing to get excited about yet, said Dr. White, but he has run onto some near misses.



N LA research on lime and lime-pozzolan mixtures is continuing with vigor, according to Prof. George Hollon, Civil Engineering Dept., University of Illinois, who has charge of the project. A circular test track for evaluating highway materials has been completed at the U. of I. laboratory. It will be a "little AASHO" project, in that various types of bases and surfaces will be tested under several tire load pressures. The mixture described by Prof. Hollon contained 4 percent lime, 14 percent fly ash, 82 percent minus ¾-in. gravel aggregate, 8 percent moisture. Beams of 6 x 6 x 36-in. size were made for testing first, since it was necessary to have basic data on the materials. Various thicknesses of the lime-fly ash-aggregate mixture were used.

Original tests of the circular track were at 1,800 psi. wheel load. These were made primarily to check the various instruments installed with the track. Now, the real testing is ready to begin. It is proposed that series of tests will be run at 3,000 psi., then at 3,200 psi. New thicknesses of the materials will be worked out prior to the testing at various loads. Preliminary estimates are that the lime-pozzolan mixes should show stamina and good wearing life.

Please turn page



We're running a little AASHO test... —Prof. George Hollon

National Lime Association meeting report

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Our biggest problem is the need for more markets... —Robert S. Boynton

S. per-capita consumption of lime falls away behind that of some other countries, specifically Germany. Average use here is only 139 lb. of lime per person, including all captive output. Compare that with an average use of 360 lb. per person in Germany, and the possibility for lime-industry growth is evident. In pointing out this fact, NLA's General Manager Robert S. Boynton said that steel and highways are the only two expanding markets the industry has at present. The future outlook for steel is not too rosy, though; steel is beset with troubles, and there is good cause to wonder about how fast the steel industry will install new oxygen converter systems—which use more burned lime. Also, it was reported that some plants have stopped using burned lime and are using pulverized limestone. "This points up," said Boynton, "the need for research."

The lime industry has built new markets "out of bed rock" in the highway area. Results to date are satisfactory on lime stabilization, but there's still more work to do. It is estimated that this market represents now a solid quarter-million tons annually.



First-of-its-kind safety award, for 4,000 consecutive no-injury days, was presented to the Springfield, Missouri, plant of Ash Grove Lime and Portland Cement Company

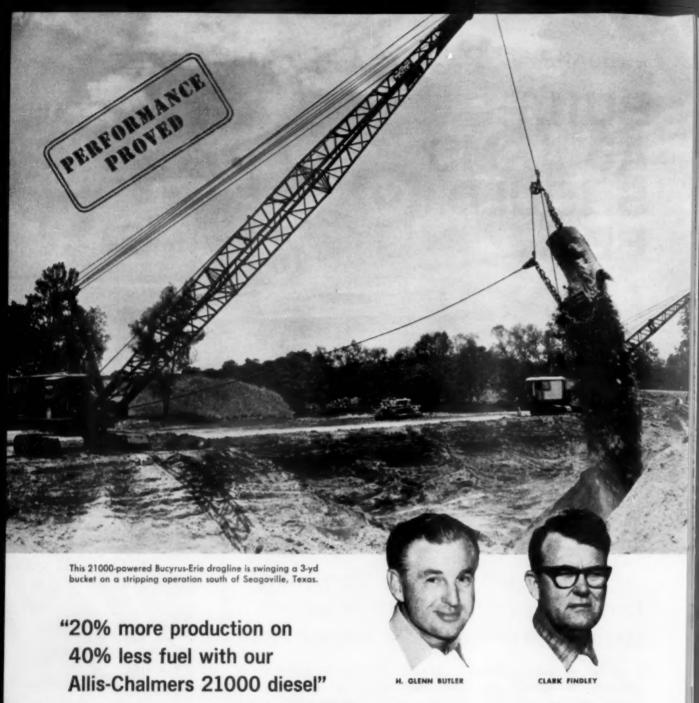
The big news in lime safety is that the Springfield, Mo., plant of Ash Grove Lime & Portland Cement Co., reached its 4,000-day mark without a disabling injury on January 23. On February 10 of this year, that plant completed 11 consecutive years of no-injury operation. NLA presented the plant with a special 4,000-day award. In addition, presentation of 1,000-day awards went to: Kimballton, Va., plant of Standard Lime & Cement Corporation, and to the Natividad plant of Kaiser Aluminum & Chemical Corporation.

Following are the winners in the 1960 NLA Safety Competition, each of which will receive a ROCK PRODUCTS trophy: Class A-1, Genoa plant, U. S. Gypsum Co.; Class A-2, York plant, National Gypsum Co.; Class B, Peerless Rotary plant, Mississippi Lime Co.; and Class C, Thornton plant, Material Service Div., General Dynamics Corp.

New officers of NLA, elected to serve during 1961-1962, include: Amos B. Miner, National Gypsum Co., president and chairman of the board; M. A. Rikard, Southern Cement Co., vice president and vice chairman of the board; W. H. Price II, The Gibsonburg Lime Products Co., treasurer; Robert S. Boynton, general manager; Georgia M. Coffman, secretary; and K. A. Gutschick, manager, Technical Services. The latter three were re-elected at the meeting.

Honored guests at the meeting, travelling from across the seas, included: Dr. Herman Lange, Hohenlimburger Kalkwerke, Hohenlimburg, Germany, and president of the German Lime Association; Dr. & Mrs. Paul Alff, Bundesverband Kalkindustrie, Koln, Germany, also general manager of the German Lime Association; Mr. Ernest Ellsiepen, manager, Rheinische Kaldsteinwerke, Wuelfrath, Germany; and Dr. Paul Ugowski, Dornap, Germany. The latter two are affiliated with the two largest lime producing companies in the world.





... says Butler-Findley Co.

Repowering a Bucyrus-Erie 54-B dragline with an Allis-Chalmers 21000 diesel boosted stripping operations 20 percent for Butler-Findley Co., Dallas, according to Clark Findley, superintendent and production manager. "This engine has given a good old machine new life and stamina," said Mr. Findley.

H. Glenn Butler adds, "Not only that, we are realizing fuel savings of over 40 percent! The

21000 uses less than 5 gal. per hour compared with over 8 gal. for engines in our other machines of the same capacity. We get more work done with much less operation expense, which means dollars to us."

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Rocklite's 20th birthday . . .

continued from page 95

The plant has five kilns. Four are used in normal operations, allowing systematic, efficient maintenance with no enforced downtime. Four kilns (three 8 x 125 feet, and one 8 x 110 feet) are fed directly from the storage bins by their own conveyors. The fifth kiln (8 x 110 ft.) is fed by a cross conveyor that can draw feed from any of the four storage bins. A sliding conveyor provides additional flexibility by allowing any of the first four kilns to draw feed from any storage bin.

Careful control of the calcining process is essential. Temperatures are carefully maintained at approximately 2,000 deg. F.—the point of incipient fusion. At this temperature, particles bloat in the firing zone and form round, evenly sized pellets that remain separate after cooling. If temperatures get too hot, the material will conglomerate. If too cool, the shale will not bloat properly. Occasional temperature adjustments are necessary to compensate for atmospheric conditions.

Since each kiln burns only one size of material, kiln speed and feed rates can be precisely adjusted to give optimum results. In producing sand the kiln revolves completely in 45 to 50 sec. The 1-in. material requires a cycle of 60 to 65 sec.

Feed rates are controlled by vari-drive motors on the feed belts. If feed falls off, external vibrators on the bins are started automatically.

The fired product is removed from the kiln and its weight per cubic foot recorded every 30 min. as a positive quality control. In addition, the company maintains a plant laboratory which conducts other daily tests on product quality.

The calcined aggregate passes directly from the kilns into rotary coolers where jets of atomized water cool it to about 150 deg. F. before it is conveyed to the final screening tower.

The kilns are fired by natural gas. During some winter periods, the gas is unavailable and standby oil firing is used.

"Only an active continuing program of product and market research can assure growth comparable to what we have experienced in the last 20 years," says E. A. Peterson, Rocklite's vice president and general manager. "Real growth in sales of lightweight concrete will have to come, particularly, from the structural field.

"A realistic view of the future has intensified Rocklite's plans for even greater efficiency and an aggressive search for new markets to make the next two decades as successful as the last two."

Officers of Rocklite Products, besides Mr. Peterson, are E. F. Brovelli, president; A. G. Streblow, director; J. R. Anderson, secretary-treasurer; D. O. McCall, vice president: John Meloni, engineer, and M. E. Fitzpatrick, sales manager.

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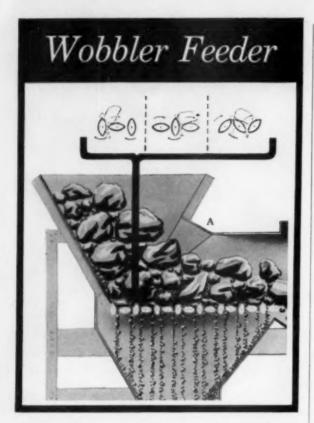


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A prominent Arkansas white lime company installed a Wobbler Feeder to satisfy their need for a uniform size material with minimum fines for calcination. They also wanted increased output.

They doubled the primary capacity of their limestone operation. And they got a high quality finished product.

Here's how: the Wobbler Feeder (A) takes material directly from the quarry. The tumbling, rocking, forward motion of the load on the Wobbler, quickly and efficiently sifts fine clay and material under 4½" to bottom conveyor, by-passing the jaw crusher completely. Because the Wobbler scalps as it feeds without binding or plugging, it is particularly valuable in

wet, sticky material.

The Lime Company's Wobbler Feeder handles from 1200 to 1500 tons per day. Since the Wobbler sends only oversize to the primary crusher, the crusher can handle more material per day, and the Wobbler requires less power than any previous feeding equipment. It is not surprizing that this Arkansas producer is pleased with his purchase.

Learn more about the profitable advantages of the Wobbler Feeder.

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Huge crane . . .

continued from page 87

ting. But Dundee operators apparently like the way the reactor control smoothly accelerates and decelerates its crane controls while keeping heating to a minimum. And, of course, the reactor controls eliminate motor-generator sets.

The operator has an easier time synchronizing the motors, and can take advantage of dynamic braking on the trolley and bridge motions. Also taking advantage of the low torques obtainable with reactors, operation of the bucket is simplified by permitting it to settle into the clinker during digging and pick-up of heaping loads, without requiring slack in the holding cables.

Here are some major features of the crane:

 Motors are of wound rotor type, with totally enclosed fan-cooled construction providing continuous-duty service and dust protection.

• Bucket hoist holding and closing operations are each powered by a 200-hp. 900-rpm. motor.

• No cross shaft is necessary on the bridge drive, as the rigidity of the 500,000-lb. structure serves the same purpose in resisting skew. Differences in motor loading and in trolley position have very little effect on skew, and the crane tracks perfectly, even though there is no electrical synchronization of the four motors operating the bridge drive. These motors are rated at 75 hp., 1,200 rpm. each, and drive four of the eight tracking wheels.

• The trolley drive utilizes two 40-hp., 1,200-rpm. motors. Rails are mounted on the inboard edge of the girder in order to reduce trolley spread and maintain maximum rigidity and economy. The trolley structural frame also helps offset the weight of the control equipment mounted inside and against the outer web of the main girder.

With its 6-cu. yd. bucket, the crane scoops up clinker from two 460-ft. long kilns and dumps it for cooling or storing. It is also used to keep certain silos filled with the proper type of clinker for gravity feed into a battery of five 2,500-hp. grinding mills. Occasionally, the crane is required to loosen material in the silos. During winter months it builds up storage amounting to approximately 200,000 tons of clinker, accumulating it 60 ft. deep under the crane way with the toe of the piles outside the building.

Minimal hauling distance is achieved by having the 150-ft. crane-span equal one-half the runway. The trolley moves simultaneously with the bridge in the shortest possible travel path.

MAJOR EQUIPMENT REFERENCE

Overhead crane,						0
150-ft	Milwaukee	Crane	Div.,	Novo	Industrial	Corp.
Electrical motors & Ac. reactor control	controls		We	stingh	ouse Elect	ric Co.
Bucket, 6-cu. yd					. Blaw-Kn	ox Co.

Rocky's Notes

continued from page 22

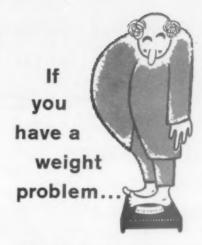
and composition were the apparent relative amounts of tricalcium silicate. No significant correlation was found between strength and other measures of compound composition, or between strength and fineness [of grinding].

Since all portland cements are known to vary in early strength according to the calculated percentage of tricalcium silicate, this finding is not very significant, except that it does show that the tricalcium silicate is the variable factor causing the greatest lack of uniformity in portland cement. Again, as in the first investigation, it is emphasized that for source No. 6, ranges in both tricalcium silicate and strength were small. In other words, it appears possible to make a uniform cement by keeping the lime ratio in the raw mix relatively low, for source No. 6 had the lowest percentage of tricalcium silicate (about 30 percent).

In our discussion of the earlier report we suggested that variations in the cement from a single source might be due to seasonal causes—that cement made during the winter months or slack periods might be better aged, aerated or blended. The present report seems to dispose of the aging or seasonal theory. However, tests of samples from different parts of the same car shipment showed very good evidence of uniformity, the report says, offering "comforting assurance that cement manufactured at any one time is highly uniform." It would seem necessary to know more about the particular shipment to draw the conclusion that it was all "manufactured" at the same time. If it was a bulk shipment from silos, it is more probable that its uniformity was due to better blending.

We believe that the answer to the problem is largely in better blending. It seems impossible to effectively improve the manufacturing processvariable raw materials, impossibility of truly accurate proportioning and blending of raw materials; variable conditions in kilns and coolers, in spite of the best controls possible. In a bulk handling and processing process such as the manufacture of portland cement, real chemical control will probably never be possible, without sacrifice of cost and volume. It is probably easier with some raw materials and mill equipment than with others. However, it seems to us that cements are bound to vary or lack desirable uniformity, under present circumstances, from shipment to shipment. It seems equally evident that the answer is blending the best with the worst, getting uniformity even at the expense of some strength loss in certain instances.

In this connection we are reminded of a visit many years ago with a veteran Lehigh Valley ce-Please turn page



Our business is solving other people's weight problems. Usually, these problems involve wanting to know exactly how much weight passes over a conveyor in a given time period. Often, the problem is to control the flow of material into a continuous mixing process. And frequently, somebody asks us to help him automate a complete process system, with interlocks, time delay relays, and complete circuitry control systems.

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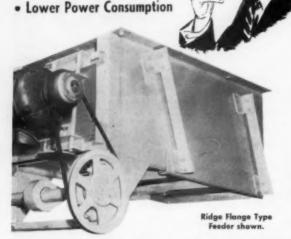
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Rocky's Notes

continued from page 119

ment manufacturer. Kiln linings in those days were not very reliable, and the manufacturer said it was not unusual for a hunk of the lining to drop out into the clinker. But, said he, with a knowing smile, they never bothered to pick it out; that it went on through the grinding mills with the clinker and apparently "made good portland cement." In those days the use of screw conveyors for transport of both clinker and cement to the mills, storage and bagging bins was universal. Screw conveyors are among the very best devices for blending dry materials. So, we attribute the satisfactory results in making cement from refractory brick to the fact that the ground-up kiln lining was so well blended with good cement that no detrimental effect was evident.

Present methods of air transport apparently do not provide equally good blending, unless specially designed for that purpose. An example of how it can be done is described in Mining Engineering (AIME journal) for March 1961. The problem is very similar to the one faced by the cement industry. The Gouverneur Talc Co., Gouverneur, N.Y., was stumped "to meet an ever-increasing demand by consumers for uniformity of ground talc." Five different grades or varieties of talc are dry ground. To quote from the article referred to above, by Robert S. McClellan, vice president of the company: "In a pebble mill circuit, which includes three 120 x 66-in. mills with mechanical air separators: The grades produced by this circuit are used principally by the ceramic industry and, to some extent, by the paint industry. In a fluid energy circuit, which includes 14 mills: The principal grade produced by this circuit has an average particle size of about 5 microns and is used almost exclusively by the paint industry.

"Following grinding, the finished grades are pumped in the dry state to 13 finished product bulk storage silos, with capacities ranging between 90 tons and 1,500 tons each. The material is reclaimed from these silos as needed and pumped to bulk hopper cars or to the bagging plant where it is packed in 50-lb. multiwall paper bags for rail shipment."

It was found in pumping the ground talc directly into the tops of the silos, as is the present practice in the cement industry, that there was segregation rather than blending. We will quote briefly from the article, just enough to give our reader a clue. If interested, he should study the whole article. This segregation took place "because of the tendency of the extreme fines to travel further down the cone under the discharge point than the coarser material. It was also found that as the material was reclaimed through the single conical bottom

of these silos, very little mixing of the material in the silo occurred.

"The first step taken to overcome these difficulties consisted of an experiment to determine whether ground material could be pumped into the bottom of a silo, instead of into the top in the conventional way. Because of the fluidity of the material resulting from the air entrained during the pumping operation, it was believed that this might work. Experiments proved that it would, and it was found that a considerable amount of mixing took place during the filling operation and that segregation of material was eliminated. The mixing takes place because of the fact that as the fluidized talc enters the bottom of the silo, a zone of material-10 ft. or more in diameter and extending the full depth of the bed of the material in the silo-becomes fluidized, and the incoming material thus mixes continuously with the material already in the silo.

"This fluidized channel, which extends from the bottom inlet to the top of the material, does not remain fixed. Following the path of least resistance, it moves from place to place so that the new material mixes with a substantial proportion of the contents of the silo. A definite increase in uniformity of shipments resulted from this step. Another beneficial effect is that when material is entering the silo through the bottom, withdrawal from the silo is more uniform and easier to control because of the fluidizing effect of the inlet stream."

The company subsequently designed new silos to take advantage of what was learned by experiment and experience. The essential details are shown in the accompanying sketch (taken from the article). The author does not say whether any features of this blending system are patented. Obviously, the same airflow principles could be applied in various ways. The key seems to be the method of filling and emptying the silos.



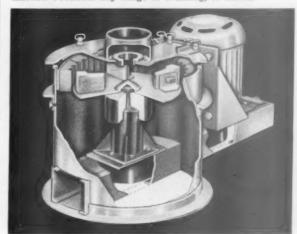
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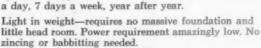
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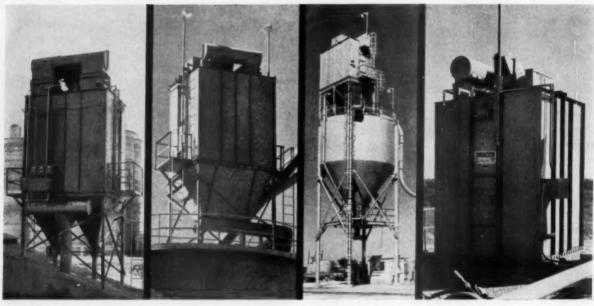


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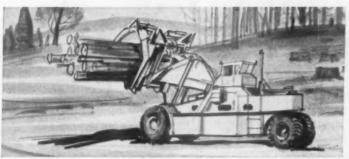
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TRUCK TALK

by Chet Cunningham

There's a new radiator cap out to remove pressure inside a tank before you lift the cap. There is a lever on top to flip up that lets the excess pressure drain out the overflow tube. When it stops hissing, flip the lever down and take off the cap with no danger of scalding your hand.

Do you get complaints about "soft tires" a week or so after new or repaired tires have been installed on your rock products trucks, scrapers and other rubber-tired rigs?

The fact is that up to 23 percent of the pressure can be lost without there being a single hole in your tire! This is due to the peculiar ability of oxygen to seep right through the structure of rubber. Our atmosphere has about 23 percent oxygen, so your tire drops in pressure by that much.

It's not the tire man's fault. Just fill up the tire again and be glad when you have enough nitrogen, carbon dioxide and other gases in there to keep it filled.

What type of a driver safety program do you have for your rock products drivers? Here is one that is used by the Daley Corp. in San Diego, Calif. Daley is a general contractor, specializing in cement and rock products contracting.

Truck Foreman Tom Lovell outlined it this way: "Participation in our program is voluntary, and it's held after working hours on the drivers' own time. Even so, we have about 99 percent present."

The program works this way. It is a joint operation by the North American Insurance Co., the Daley underwriter and the Daley firm.

Each month a 1-hr. meeting is held for all drivers. The meetings usually are used for motion pictures on safe driving, driving techniques or driving hazards. These are obtained from local, state and county police, and safety groups and from the National Safety Council in Chicago.

Outside speakers from the insurance company and local and state police are also used.

"At first, the men complained about the meet-

ings," Lovell said. "Then they discovered the meetings could be interesting—and they still learned something about better driving. After that, the men really took to the idea."

The company also encourages participation with an incentive program. For each meeting, the corporation puts a cash deposit into a special fund. At the end of the year this "pot" is divided into shares. Each driver who has a perfect driving record for that year receives so many "shares" of the pot for each meeting he has attended. Lovell says this usually amounts from \$40 to \$50 a year for a man who attends all the meetings.

Daley also has a drivers' banquet each year at one of the swank country clubs in the area. Here, the safe driver buttons are awarded.

Has the plan worked? Both Daley and their insurance company think so. It might provide a few suggestions for a driver safety program for your company.

Don't let the mechanics think that since it's almost summer they can jerk the thermostats out of your rock products trucks. Some guys are always trying it—mechanics who should know better than that.

The fact is that removing a thermostat from any water-cooled vehicle for any reason will greatly increase the fuel consumption, reduce power and contribute to spark plug fouling due to an accumulation of carbon deposits on the insulators.

If you run into excess plug fouling on one truck, check to see if that rig has had its thermostat removed. The thermostat is important to get your engine up to operating temperature quickly, and to keep it running at its most efficient temperature through the proper circulation of coolant.

When adding water to your batteries, be careful not to overfill them beyond the normal level. As the electrolyte expands, it will overflow, spilling out the battery air vents. The spilled acid will attack metal hold downs, cables and other parts close to the battery.



Haulpak® is delivering at LOWEST NET COST

Acceptance of the LW Haulpak, first all-new truck in a quarter-century, has been fast. Perhaps the best explanation for this wide-spread acceptance comes from owners* themselves. One puts it this way: "We needed trucks large and rugged enough to handle big loads, yet fast and maneuverable enough to do it economically. And we believe that with Haulpak, we have it!" Another says: "Haulpaks have cut our truck maintenance costs almost in half."

There's a tip for you in this owner's comment: "After a trip by three officials of our company to see these units in action, we chose Haulpak." Let us arrange a demonstration for you. See first-hand how you can get extra tons per hour, at lowest net cost per ton-mile, with LW Haulpaks. 5 end-dump sizes: 22 to 65 tons, up to 550 hp.

▲ Owned 3... bought 8 more!

Enthusiasm for Haulpak trucks runs high with this large U.S. cement producer. The firm put 3 LeTourneau-Westinghouse 32-ton Haulpaks to work on 7,100-ft houls (above). Adverse grades averaged 1.3%...max. was 400 ft of 5% adverse grade. Haulpaks completed cycles in an average of 8.58 minutes. Production per 50-minute hour averaged 179 tons per machine. This steady output, coupled with low-maintenance performance, led to repeat arders for 3 more 32-ton Haulpaks...then 5 more for another pit location...making a total of 11 Haulpaks to date.

*Names on request HP-2387-MGJ-2r



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

In NEBRASKA

Hauting 32-ton loads of overburden to dump area, LeTourneau-Westinghouse Hautpaks cruise along well-maintained roads at speeds to 38.8 mph. Safe? You bet! There's a total of 5,148 sq in. braking surface on 32-ton Haulpak... four times the braking area of most comparable-capacity trucks.



27-ton Haulpak highballs over typical quarry road. Hydrair® suspension cushions travel shocks...keeps load riding level, reduces spillage during high-speed houl. Center of gravity is low, because about 6 tons of material are carried below normal truck floorline in Haulpak's deep V-body.

In UTAH

Here's the big 550-hp, 60-ton Haulpak in action. This latest addition to LW line, carries almost twice its awn weight in payload capacity! Weighs approx 66,000 lbs, carries 120,000-lb payload. Reason: hightensile-strength steels, nearly 3 times stronger. X lighter than in ordinary trucks.







In CALIFORNIA

Heaped with rock, 32-ton Haulpak shows plenty of power and pep as it climbs grade. Pit-to-plant hauls are long... grades, steep and winding. Talking about acceleration and power, another LW owner reports: "Our Haulpaks come out of the pit in a higher gear, and at a faster rate of speed, than any unit we are familiar with."

In NEW MEXICO

Over-the-edge dumping minimizes clean-up on this waste bank. Notice how edge of bowl swings low, well back of rear wheels, as the body starts to raise. Dump action is fast, tool Twin hydraulic rams lift the body to full dump-angle in approx 16 seconds. LeTourneau-Westinghouse Haulpak shown below is 27-ton size.

In PENNSYLVANIA

Stripping contractor owns 4 of these LW 32-ton Haulpaks. Comparing them with conventional 22-ton trucks, contractor says: "Haulpak's short turn-around, plus high hauling speeds, mean that each of these 32-ton trucks gains one complete round trip in every seven on hauls of average length. Ours vary from 800 to 2500 feet."







PER TON-MILE for owners everywhere

In ILLINOIS

At this strip-mine, special bottom-dump Haulpaks carry 90 tons of coal per trip. Performance-proven since 1957, this giant LW houler has: springless Hydrair suspension on all wheels, Hydrair trailer-hitch, Power-Transfer differential, and many other "firsts" in big trucks.

In NEVADA

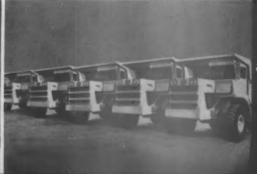
This 60-ton Haulpak works around the clock, 7 days a week, on a mile-long houl. Average adverse grader 7%. It's a grueling assignment, but LW Haulpak has the matched power, speed, and structural strength it takes to beat tough work schedules. Haulpak's production: 1668 tons per 7-hour shift!

Destination: LIBERIA

With 5 LW Haulpaks already at work, 7 more are on their way to a Liberian mine. Here's part of the latest 27-ton Haulpak fleet being readied for overseas shipment. In addition, the African mining firm has 2 LW 440 graders, and 9 C Tournapulls® building a railroad service line.







In Cement and Aggregates the Word for Air Separation is "Sturtevant"



in cement ...

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screenblinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT

MILL COMPANY

102 Clayton St., Boston, Mass.

Crushers • Grinders • Micron-Grinders • Separators Blanders • Granulators • Coaveyers • Elevators Enter 1452 on Reader Card

NEW LITERATURE

For <u>free</u> information on these items, simply fill out and <u>mail</u> postage-paid Reader Service Card found elsewhere in this issue



Controllers

Minneapolis-Honeywell Regulator Co., Industrial Div., has released a 56-page catalog that covers the complete line of the company's controllers—pneumatic and electric. This detailed, illustrated catalog covers new modular design features as well as the new proportional plus reset plus rate control units, partial chart listings, and pneumatic and electric contact control forms.

Ester 700 on Reader Cord

Sleeve bearings

Link-Belt Co. has made available a 6-page folder that announces the two new types of self-aligning and self-lubricating sleeve bearings in flanged and pillow-block types. The sleeve bearings solve application problems of temperatures up to 1,000 deg. F.; corrosive and contaminating conditions; underwater operations; lubricating problems and where noise is a factor. The folder illustrates how block

have been successfully applied through a wide range of applications. Also described are benefits and features of these new units and listed are application, selection and dimensions.

Enter 701 on Reader Card

Automatic controls

Synchro-Start Products, Inc., has made available a bulletin on the company's line of automatic controls. Included in the bulletin are automatic engine controls, governors and speed switches, dc. solenoids and accessories. Illustrations aid the descriptions of the controls.

Enter 702 on Reader Card

Washing-classifying equipment

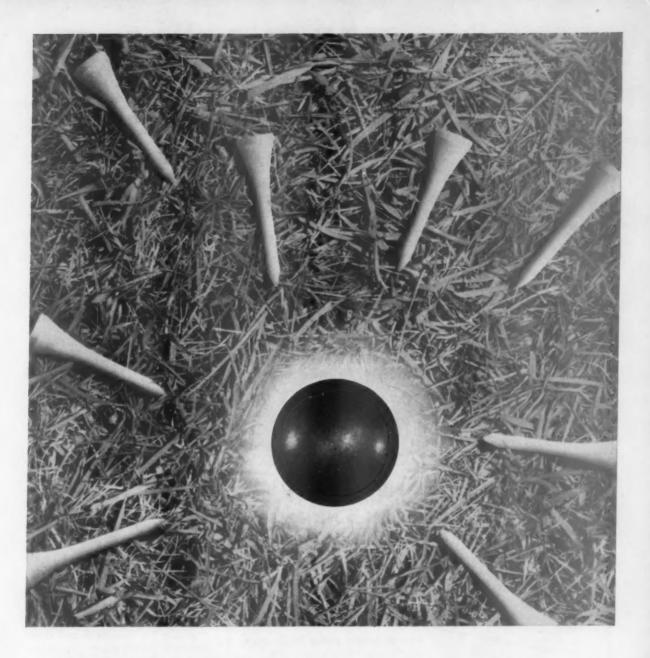
Eagle Iron Works has released a 48-page catalog that describes the company's line of washingclassifying equipment for sand, gravel, crushed stone and ore. The catalog lists specifications and gives descriptions and illustrations for each type of equipment offered by the company.

Enter 703 on Reader Card

Tractor loader

J. I. Case Co. has released a 16-page, illustrated catalog on the company's four-wheel-drive loaders. Designed for easy performance and application reference, the catalog lists specifications on each of the three models manufactured by the company.

Enter 704 on Roader Card Please turn to page 132



Tee'd off about grinding balls?

Then call that old pro, your CF&I salesman. He can supply grinding balls that will give you a better score and keep your mill throughput up and your blood pressure down.

Made from forged alloy or carbon steel, every CF&I Grinding Ball is up to par—outstanding resistance to wear and impact splitting...exceptional

uniformity of roundness, density and other physical properties. CF&I Grinding Balls are available in the following diameter sizes: Forged Alloy Steel—1½" to 4"; Forged Carbon Steel—¾" to 5". No matter which you choose, you're going to be down the middle of every fairway and putting for a birdie.

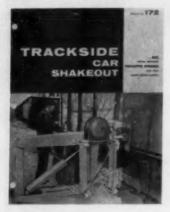
Other quality CFal Steel Products for basic industries
Grinding Rods • Mine Rails and Accessories • Rock Bolts • Realock
Metallic Fabric • Industrial Screens • Wickwire Rope • Grader Blades



The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales Offices in Key Cities

Enter 1434 on Reader Card

continued from page 130



Trackside car shakeout

Hewitt-Robins describes its trackside car shakeout in a new bulletin. Complete pushbutton control makes the shakeout a one-man job. Equipment can be operated automatically from a remote control station. The vibrating head sets automatically against side of the car. More than 14 tons of vibrating force are applied. Covered hopper cars can be unloaded with the shakeout; only a concrete base is required. The unit weighs 2,400 lb., is equipped with a 7½-ph. high-torque vibrator drive and a 3-hp. hydraulic pump motor.

Enter 705 on Reader Card

Excavator mailer

Koehring Div., Koehring Co., discusses two crawler crane-excavators in a new mailer. Entitled "Make More Dollars Move," it features the ¾ and 1-yd. crawler machines. It shows, through 10 on-the-job photographs and appropriate descriptive copy, how these models perform on pipeline, road, building and quarry work. Hoe, shovel, clam, dragline and crane front ends are illustrated.

Enter 706 on Reader Card

Refractory selection

Kaiser Refractories Div., Kaiser Aluminum & Chemical Sales, Inc., has offered a 24-page technical booklet covering the installation and selection of refractories for cement and lime kilns. The booklet covers the choice of the proper type of refractory for use in specific heat zones within the kiln. Installation procedures are outlined as well as start-up. heat-up operating, cooling down, repair and maintenance of rotary and vertical shaft kilns. Most of the technical information covers the performance and installation of refractories in cement and lime kilns.

Enter 707 on Reader Card

Smooth-roll shell

Columbia Steel Casting Co., Inc., manufacturer of manganese steel replacement parts for crushers, tractors and shovels, announces the publication of a new bulletin giving detailed information about the company's 40 x 22-in. smooth-roll shell. The bulletin gives complete and comprehensive information, including the drawing number, the weight, various dimensions and metallurgical information.

Enter 708 on Reader Card

Rotary feeder bulletin

Fuller Co. describes and illustrates a rotary feeder for delivering and controlling the feed rate of dry, pulverized, and granular materials into high pressure pneumatic conveying systems in a new bulletin. It is the company's latest addition to the field of dense stream conveying. It delivers into low air volume. high pressure systems with efficiencies as high as 98.4 percent. Included in the bulletin is a photograph, as well as dimensioned drawings and specifications for all feeder sizes.

> Enter 709 on Reader Card END



A NEW BOOK by JAMES A. NICHOLSON

GIVES YOU THE SCORE

Single Copies only \$5.00 each. Five to twenty copies \$4.00 each.

"Ready Mixed Concrete", is an historical, authoritative account of one of the fastest growing industries in the world.

Written especially for people in the Ready Mixed Concrete Industry the book is a harvest of factual information on every fundamental phase of the business.

Give a copy to every employee who has a hand in YOUR reputation for quality mixes, and in YOUR profits. Order your copies today.

ROCK PRODUCTS

79 WEST MONROE ST. CHICAGO 3, ILLINOIS

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RAYMOND LOW COST PULVERIZING



After more than 25 years of top-level performance in the cement industry, these modern Bowl Mills still lead the field in pulverizing economy and kiln burning efficiency. Because of time-proven advantages, more and more operators of cement, lime and dolomite kilns are equipping their new plants with Bowl Mills . . . or converting their old plants to Bowl Mill installations.

The principle of incorporating a revolving bowl and stationary grinding rolls, with no metal-to-metal contact, provides wide range capacity at continuous 24 hour, noiseless, vibrationless operation. Availability is almost 100 per cent.

Write for Bowl Mill Catalog Number 92 R.

RAYMOND MECHANICAL AIR SEPARATOR

This unit, available in nine commercial sizes, is equipped with a patented revolving Whizzer, single or double type, and offers three general types of application.

A. In closed circuit with a grinding unit for increasing fineness

and mill capacity.

B. In open circuit operation for removing a coarse fraction to

deliver a uniformly fine product.

C. In open circuit for dedusting operations to remove objection-

able fines in making granular products.

An internal air distribution system for handling special materials, which require cooling or drying may be provided. Additional liners are furnished for classifying abrasive materials.

Write for Raymond Mechanical Air Separator Catalog Number 90 R.



Double Whizzer Separator showing air openings.

COMBUSTION ENGINEERING, INC. Combustion Engineering- Kaymond Division Sales Offices

Superheater Ltd. Montreal, Quebec, Canada

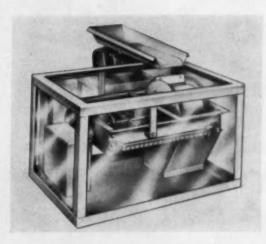
427 WEST RANDOLPH STREET . CHICAGO 6, ILLINOIS

in all **Principal Cities**

Enter 1435 on Reader Card

NEW MACHINERY

For free information on these ideas, simply fill out and mail postage-paid Reader Service Card found elsewhere in this issue



Weighing feeder

A new Gravimetric Feeder has been designed to assure accurate, continuous weighing and feeding of granular bulk materials. The use of the new feeder is said to improve the efficiency of mills, dryers, mixers and many other process machines.

In operation, a vibratory feeder places material on a weighing wheel mounted on a scale beam. With the poise set at the required weight, over and under movements of the beam actuate a control. This, in turn, automatically increases or decreases the speed of the vibratory feeder.

Five models are offered with capacities between ½ ton and 300 tph. (Syntron Co., Homer City, Pennsylvania)

Pressure packer for multiwall bags

The Force Flow packer features a pressure chamber that provides a more tightly filled multiwall bag of cement, plaster, lime or agricultural limestone. It assures higher production rates with packaging economies. In addition, the machine is easily adjustable for different bag sizes and weights. Weight accuracy is excellent—within plus-or-minus 4 oz. on most products.

The new machine is completely pneumatic and explosion-proof. It has few moving parts and no

rotating parts. Air requirements for the control circuit are 1½ cfm. at 80 psi. under average conditions, while pressurization and fluidization call for about 50 cfm. at about 10 psi. (St. Regis Paper Co., 150 E. 42nd St., New York 17, N.Y.)

Enter 301 on Reader Card

Hard-surfacing electrode

An iron powder, low-hydrogen hard-surfacing electrode is offered for severe abrasion under low stress conditions. Hardalloy 48 has deposition rates 50 percent higher than conventional electrodes, according to the manufacturer.

The new electrode operates on either ac. or dc. reverse polarity with a quiet, stable arc and fast transfer. Deposits are sound and very smooth under an easily removed slag. Although high operating currents are used, penetration and base metal dilution is kept to a minimum.

Each pound of electrode covers 18 to 22 sq. in. about $\frac{1}{8}$ in. thick. Rods are offered in $\frac{1}{8}$, $\frac{5}{32}$ and $\frac{3}{16}$ -in. sizes in standard 14-in. lengths. (The Mc-Kay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.)

Enter 302 on Reader Card

High-speed scale indicator

The advantages of electronic scale operation can now be realized with the development of an electronic dial indicator. A weight reading may now be taken in less than $2\frac{1}{2}$ sec. after a load has been positioned on the weigh platform. This new electronic dial tends to eliminate the effects of excessive vibration around the scale and it is particularly applicable where speed and stability are necessary.

This fast weight indication is achieved with a new two-speed indicator drive that combines the separate advantages of slow and fast indicator travel. The new unit does not alter the exterior appearance of this manufacturer's dials and it is available in a full range of capacities. (Toledo Scale Corp., Toledo 12, Ohio)

Enter 303 on Recoder Cord

Please turn to page 136

How Union-Camp's 5-Star Multiwall Plan increased a pallet payload by 400 lbs...without increasing its size!

A leading supplier of high density resins* had been packing his product in 50-lb. sewn-bottom multiwalls. This gave him an efficient, 40-bag (2,000 lb.) pallet load.

When he added a low density resin to his line, however, he found his existing bag wouldn't accommodate 50 lbs. of the new resin due to its increased volume. A slightly larger, sewn-bottom multiwall was tried, but this reduced the pallet payload to 32 bags (1,600 lbs.). Net "loss": 400 lbs. Net result: more handling ... more trips to the warehouse ... higher cost.

Heightening the pallets to 10 tiers instead of 8, offered no solution—they wouldn't pass through the existing archways. To say nothing of the problem of loading trucks and trailer cars.

New bag does the trick

At this point, the 5-Star Packaging Efficiency Plan went to work. Union-Camp multiwall specialists experimented with several different bag sizes and styles. Their solution—a multiwall with a pasted bottom and side gussets, a rectangular-shaped base—and 20 per cent more capacity!

With the new design, 50 lbs. of the low density resin can now be packed in each bag. Most importantly, the pasted bottom bags can be palletized five to a tier, eight tiers to a skid for

a total payload of 2,000 lbs.—the same as the high density resins.

Warehouse space saved

The pasted-bottom bag offered several outstanding advantages. It permitted better use of warehouse space. It increased the yield per warehouseman to 1,000,000 lbs. a month. And it initiated the development of a similar design for the company's high density resins, which could increase the present pallet payload to 2,500 lbs.



Space-saving secret is in bottom of bag. New design (left) with rectangular-shaped base has 20 per cent more capacity than sewn-bottom bag (right).

Works for you five ways

Apart from bag construction and materials handling, Union-Camp's 5-Star Plan covers bag design, packaging machinery and specifications control. An improvement in any one of these areas conceivably could result in substantial savings for you. In any case, it costs nothing to find out.

See your local Union-Camp man for complete details.



2,000 palled load of new, low density resin bags fits easily through existing doors.

FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.



Union Bag-Camp Paper Corporation 233 Broadway N V 7 N V

* NAME ON REQUEST

New Machinery continued from page 134

Secondary crusher for sticky materials

Twin-Rotor Impactor is the name of a crusher that has been especially designed to eliminate the problems of fine-crushing wet and sticky materials. Since there are no cage bars or grates to plug, clays, shales and clayey limestone can be reduced to fine sizes without plugging or caking in the crusher. In addition, the crusher's liners are offset to permit torches to be mounted in the space between liners and frame. This feature prevents any buildup of materials on the liners.

The new crusher is offered in two sizes for rated capacities up to 100 tph. when making 8-mesh in closed circuit. Power requirements are as low as 25 hp. per rotor. Since the unit does not vibrate in action, heavy foundations are not needed. (Pennsylvania Crusher Div., Bath Iron Works Corp., West Chester, Pa.)

Enter 304 on Roader Card

Semiautomatic hard-surfacing unit

A new wire feed unit is said to be ideal for applications in hard-to-get-at places or where a hoist is used to position the feed unit. The additional wire supply provided by the Weld-Pak reduces the number of trips to get additional wire and it eliminates the short-coil loss when a partial coil must be removed from the machine.

The new unit provides 125 lb. of continuous welding wire. Yet the weight of the machine is no greater than machines with smaller capacity. This feature provides more available time for welding without downtime for changeover. (Alloy Rods Co., P.O. Box 1828, York, Pa.)

Enter 305 on Reader Card

Portable screen-loader

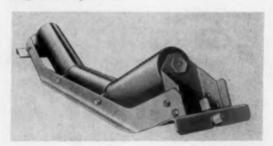
A new portable screen with loading conveyor gives the small rock products producer screening efficiency and flexibility in the lower capacity ranges. The Porto-screen is offered in 50 and 85-tph. units completely and compactly mounted on a two-wheel trailer.

Each unit is equipped with a large loading hop-

per with bar grid, a reciprocating plate feeder and a single-deck vibrating screen. Material through the inclined screen discharges to a belt conveyor while oversize drops to the ground or to an optional belt conveyor. Power is supplied by a gasoline engine tucked under the inclined belt conveyor. The whole assembly weighs 4,500 lb. for the smaller unit and 9,700 lb. for the larger. (Eastern Engineering Sales Co., 25 W. Howard St., Quincy 69, Mass.)

Enter 306 on Reader Card

Rope conveyor idler



A new troughing idler has been developed especially for rope stringer conveyor systems. The design of the fastener assures positive attachment to the wire rope without damage. Special nuts are used in the 8-in. long clamp to protect the bolts from damage or corrosion.

The idler rolls themselves are interchangeable in the welded frame. Each roll has rounded edges to avoid belt damage, and there are minimum spaces between the idler rolls. Rolls are available in four diameters: 2¾, 4, 5 and 6 in. The rolls from 4 or 5-in. standard rigid idlers can be used in the new type-L frames when converting to rope stringer conveyors. (Hewitt-Robins Inc., 664 Glenbrook Rd., Stamford, Conn.)

Enter 307 on Reader Card

Check metal parts for defects

Castings, weldments and fabricated metal parts can now be checked for soundness quickly and easily. Spotcheck is a spray-on dye penetrant that gives a clear, unmistakable signal in the presence of cracks or metal defects.

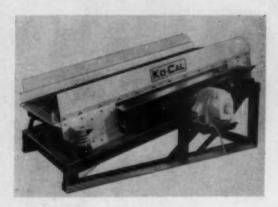
All materials are available in pressure cans. With complete portable kits there are no pumps, brushes or hose lines. Spotcheck is non-toxic and safe to use. (Magnaflux Corp., 7301 W. Ainslie Ave., Chicago 31, Ill.)

Enter 308 on Reader Card Please turn to page 138 Of the many
good things said about
BUCYRUS ERIE machin
the best concern
low cost per ton
produced!

Put the price on production and you'll buy a BUCYRUS

New Machinery

continued from page 136



Double-shaft vibrating screen

Double eccentric shafts instead of the usual single shaft give this new vibrating screen exceptional efficiency. A uniform pulsating action achieves effective screening on all parts of the screen cloth and this results in higher screening capacity.

Other features include a screen cloth that is bolted to side plates to eliminate welding tensions and an oversize drive belt to maintain rotation timing of both shafts. All three drive sheaves are eccentric bored to counteract screen action and produce a smooth-running screen.

The new Twin-Shaft screen is available in three sizes— 4×8 ft., $4\frac{1}{2} \times 10$ ft. and 5×14 ft. (Koehring California Co., 2200 Country Club Blvd., Stockton 4, Calif.)

Enter 309 on Reader Card

Variable-speed belting by the roll

Belting for variable-speed drives is now available by the roll in single or twin-link types. Designated as Adjusta-Link, the belting fits all V-to-V sheaves and is interchangeable with all endless-moulded and wood block belts. All widths are available between $\frac{7}{8}$ and 4 in.

Every foot of belting is prestretched and tested to assure perfect rigidity and minimum vibration. Each link is die cut from heat and oil-resistant material. (Lovejoy Flexible Coupling Co., 4838 W. Lake St., Chicago 44, Ill.)

Enter 310 on Reader Card

Bin level controller

The level of bulk materials in hoppers, bins or silos can be sensed and controlled with a new highlevel indicator. A removable pendulum is suspended from a weatherproof, dust-tight contactor, and the whole assembly located at a predetermined level in a bin. As sand, gravel, crushed stone, light-weight aggregates or other materials come into the bin, they actuate the control when the pendulum "floats" on the top of the pile. A six-degree movement of the pendulum provides the necessary signal to actuate lights, horns or other devices. (Connecticut Research Associates Inc., Danbury Airport, Danbury, Conn.)

Enter 311 on Reader Card

End-dump trailer



A new end-dump trailer of unusual design offers exceptional stability when dumping on uneven terrain. The stability of the undercarriage is achieved with a torque-arm cantilever that prevents the trailer from twisting as the load center shifts. The stability of the undercarriage permits use of an oscillating upper fifth wheel plate. This plate relieves any stresses from either tractor or trailer. A 50-deg. dumping angle is provided by a 4-stage cylinder that allows the hoist to work from the front of the trailer—the point of best leverage. (Omaha Standard Inc., 2401 W. Broadway, Council Bluffs, Iowa)

Enter 312 on Reader Card

Extra-strong roller chain

The conventional precision-type roller chain has been redesigned to achieve extraordinary strength without a corresponding increase in weight. Named the Bowman chain, it has 39 percent greater bearing area and an ultimate tensile strength 58 percent greater than a standard roller chain of the same nominal size. For the present the new chain is offered in 2-in. pitch and it is recommended for use only with hardened sprockets. (The Jeffrey Manufacturing Co., Columbus, Ohio)

Enter 313 on Reader Card Please turn to page 140 now 45 and 62-tons

Model R-45
30 yds. struck... 45 tons
Model R-62
40 yds. struck... 62 tons

Designed and built for heavy off-highway service in construction, mine, quarry and industrial work, Rear-Dump "Eucs" have paced the industry for over 25 years. Now rated capacities of the two biggest models have been increased to meet field demand for still larger payloads than before.

For work under large loading shovels on the big tonnage, big yardage jobs, check these Model R-45 and R-62 "Eucs". They have payload capacities of 90,000 and 124,000 pounds and replace the widely used 40 and 55-ton models in the Euclid line of rear-dumps.

Use of high strength alloy steel for all body wearing surfaces cuts net weight and increases payload capacity... there's no compromise on the rugged durability and performance that "Eucs" are known for throughout the world. And, although they're new in size, both the R-45 and R-62 have years of job-proved dependability since they are of the same design and incorporate the same major components as the well-known models they supersede.

Have your Euclid dealer give you detailed information and show you how these big "Eucs" can cut your hauling costs. Euclid Division of General Motors, Hudson, Ohio

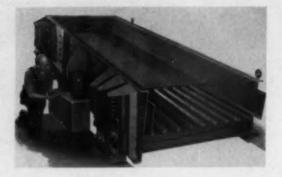




DIVISION OF GENERAL MOTORS, HUDSON, OHIO Plants at Cleveland and Mudson, Ohio and Lanarkshire, Scotland

New Machinery

continued from page 138



Heavy-duty vibrating feeders

Low-Head heavy-duty vibrating feeders are now offered for particularly severe operating conditions in the rock products industry to handle sand and gravel or crushed stone out of primary dump hoppers or from surge piles.

The new feeders are available with 5 or 10-deg. slopes, with solid pan deck or in combination with a manganese steel grizzly section at the discharge end. Of course, they are available in varying widths up to 6 ft. and in lengths up to 16 ft.

When variable-feed rates are necessary, each unit can be supplied with a variable-speed, wound rotor motor. Otherwise, a standard or high-torque motor is offered. Pans, sideplates and grizzly bars are replaceable. (Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis.)

Enter 314 on Reader Card

Larger variable-speed drive

This manufacturer's line of motorized variablespeed drives has been extended into the range between 25 and 40 hp. The unit is available with single, double or triple reduction gearing to give speed ratios up to 4 to 1 and a range of output speeds between 25 and 2,630 rpm.

The size 600 Motodrive provides over 100 different standard assemblies, including vertical, horizontal and 45-deg. mountings in a number of different styles. In addition, optional magnetic brakes are offered with up to 230 lb.-ft. capacity. Electric remote controls, pneumatic controls and other specially designed features extend the usefulness of the new unit. (Reeves Pulley Div., Reliance Electric & Engineering Co., Cleveland 17, Ohio)

Enter 315 on Reader Card

Field testing sieve

Rock products producers who must meet exacting gradation specifications may find extensive use for a new lightweight, portable field testing sieve. In addition to its light weight, the new sieve features a two-dimensional shaking action—a circular motion with six impacts per cycle.

The 8-in. diam. sieves are supported in an aluminum frame with an epoxy resin finish that resists wear. The unit holds eight sieves, a cover and a receiving pan. (Soiltest Inc., 4711 W. North Ave., Chicago 39, Ill.)

Enter 316 on Reader Card

Portable sample splitter

A new portable sample splitter is offered particularly for field sampling of aggregates. The sturdy unit is light and small enough to be carried in an auto trunk.

Named Porta-Splitter, the new splitter takes ½-cu. ft. samples ranging from sand to 2 in. and reduces it to halves and quarters. An adaptable universal splitter chute permits quick and accurate selection of a variety of chute openings. Chute widths are easily selected by manipulation of a series of aluminum or plated steel bars. (Gilson Screen Co., Malinta, Ohio)

Enter 317 on Reader Card

Bulldozer hauling for aggregates



Western sand and gravel producers seem to have a monopoly on a system for putting aggregates into their processing system with a bull-dozer. This unit pushes the raw materials from the deposit right into a hopper above the first conveyor in the system. Ordinarily, each system is specially designed to suit local conditions.

A new portable conveyor with an integral hopper has been developed. The charging end of the hopper has a low profile that makes it ideal for bulldozing material into it. The whole system is sturdy enough to handle the heaviest materials including boulders and clayey chunks.

Heavy-duty troughing idlers support the conveyor throughout its length, while impact idlers under the hopper protect the belt at that point. The new loader is offered in three sizes: 42, 48 and 60-in. belt widths. (Koehring California Co., 2200 Country Club Blvd., Stockton 4, Calif.)

Enter 318 on Reader Card Please turn to page 142

LEROI LRD-2 for low cost,

powerful rotary drilling

rotary or down-the-hole drilling ... gas or diesel



Here's a highly portable blasthole drill for drilling holes up to $4\frac{1}{2}$ inches as deep as 30 feet ... equipped for either positive-drive rotary drilling or powerful down-the-hole percussive drilling.

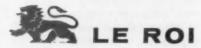
What's more, the LRD-2 is completely self-contained...and economically priced, too!

The entire unit is easily handled by one man. Controls are conveniently grouped at an operator's station located alongside the drilling area. The unit can be moved, leveling jacks hydraulically set, mast hydraulically raised, drill pipe and bits connected, and hole started all with a few nonfatiguing motions.

Powerful direct mechanical drive keeps the rotary table turning won't bog down or lose torque under rough going like air or hydraulic driven units — eats through tough rock formations under 10,000 lbs. pulldown pressure at speeds from 40 to 250 rpm. If necessary, a hard-hitting down-the-hole drill can quickly be substituted for the rotary bit to drill extremely hard rock formations.

A Le Roi 25 hp two-stage air compressor provides ample air for powering the down-the-hole drill and cleaning out hole . . . or is available in single-stage where only rotary drilling is necessary.

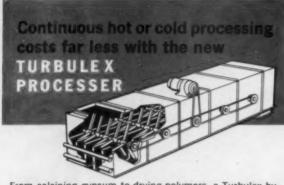
The self-propelled LRD-2 is available either on crawler or tire mounting and with either gasoline or diesel power unit. A whole list of extra equipment is available to ease or speed drilling, including lights for night-time operation, a mounted bit grinder, air hoist, breakout tongs, water injection system, . . . all detailed in Specification Sheet AT-146. Write for your copy.



division of Westinghouse Air Brake Co.

Sidney, Ohio





From calcining gypsum to drying polymers, a Turbulex by Western Precipitation is ideal for continuous hot or cold processing of free-flowing solids.

It's ECONOMICAL. Simple design makes it easy and inexpensive to fabricate, operate, maintain.

EFFICIENT. In calcining, thermal efficiency as much as 2½ times the conventional kettle process - 78% vs 30%! WIDE USE of the new Turbulex is possible wherever low cost, continuous, efficient processing is needed . . . in industries such as food, non-metallic minerals, chemical, petrochemical and non-ferrous metallurgical.

WANT DETAILS? For literature, write Western Precipitation, 1000 West 9th St., Los Angeles 54, Calif. (In Canada, write 8285 Mountain Sights Ave., Montreal, P.Q.)



Enter 1458 on Roader Card



Complete Klin Replacement Parts **Agitator Parts** Babbitt Shells for Bearings

Base Plates

WELDERS & FABRICATORS Bushings Conveyor Screws Couplings Drag Chain Elevator Chain, **Buckets, Casings**

Feed Pipes Gears, Pinions Gear Housings Hammermill Parts



New Machinery

continued from page 140

Fan-cooled reducers

A new line of fan-cooled worm gear reducers offers up to 80 percent greater horsepower capacity than conventional units of the same size. Or, they can give the user space and weight savings for a given power requirement.

These savings are made possible with the finned housing design of the new line. A plastic or aluminum fan on the high-speed input shaft keeps a stream of air passing around the housing when the unit is in operation.

Nine sizes are offered between 3 and 12-in. centers, with ratios from 4 1/7 to 1 up to 95 to 1. Ratings range from fractional horsepower up to 175 hp. (Cleveland Worm & Gear Div., Eaton Mfg. Co., 3300 E. 80th St., Cleveland 4, Ohio)

Enter 319 on Reader Card

Variable-speed drive

A new hydraulic transmission unit is offered to provide low-cost variable-speed control. Output speeds range from 0 to 1,600 rpm. using an 1,800 rpm. motor. Capacity ranges from 2 to 10 hp., and the maker states that gasoline engines up to 20 hp. may be used as the prime mover.

Precise speed selection is attained by rotation of a small handwheel. Speed changes are smooth and constant throughout the entire range, and the controls can be adapted for remote control. It is said to be suitable for conveyors, blowers, elevators, crushers, compressors and pumps. (Roberts Electric Co., 849 W. Grand Ave., Chicago 22, Ill.)

Enter 320 on Reader Card

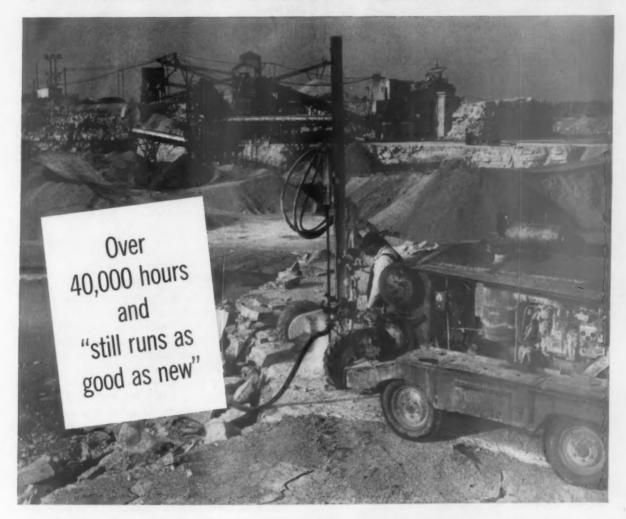
Special trucks for lease

Trucks with the special bodies that are widely used in the rock products industry are now available for lease. Terms of the lease can range between 4 and 8 years, and this equipment can be leased without the usual full maintenance, repair and garage services.

To qualify for this leasing arrangement, the prospective lessee must have a net worth of at least \$1 million and have a record of profitable operation. The leasing company will engineer the bodies to the users' needs and supervise actual manufacture of the equipment. Lease charges will be based on fleet or quantity discounts where they apply. At the end of the lease term, the equipment will be sold and the proceeds credited to the lessee's account. (Wheels, Inc., 6200 N. Western Ave., Chicago 45, Ill.)

> Enter 321 on Reader Card Please turn to page 144

GET REAL PRODUCTIVITY-GET A GM DIESEL



One look will tell you that this Ingersoll-Rand 315 Gyro-Flo compressor has had to work for a living.

And worked it has!

For over 9 years it has been on the job day in, day out, supplying air for drills and hammers in the Halquist Lannon Stone Company quarry near Sussex, Wisconsin.

In those nine years this GM Diesel powered unit has racked up over 40,000 hours—been overhauled only twice at approximately 18,000-hour intervals.

Mr. A. C. Halquist says, "The GM Diesel 3-71 in this compressor has had only minor adjustments in addition to two overhauls and still runs as good as new. It's one of the best pieces of equipment we ever bought."

If that's the kind of profit-making productivity you want from your equipment, specify a GM Diesel engine when you buy or repower. There's a model of the proper size and output for nearly every type of construction equipment.

For details see your GM Diesel Dis-

/ tributor* or write direct for your copy of the new booklet, "2300 Applications of GM Diesel Power."

*Listed in the Yellow Pages under "Engines, Diesel."



In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario Parts and Service Worldwide

GM DIESEL ALL-PURPOSE POWER LINE

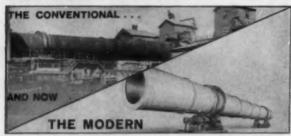
ROCK PRODUCTS, July, 1961

sets the standard of Diesel productivity

Enter 1468 on Reader Card

143

FOR 111 YEARS . . . VULCAN HAS DESIGNED AND BUILT



ROTARY KILNS

The Vulcan Iron Works, Inc., in Wilkes-Barre has the "know-how" when it comes to designing and building rotary kilns for any application.

From kilns built years ago which were held together by rivets, TO the modern patented Vulcan kiln of today, electronically welded and designed for years of trouble free service...

If you are in the market for a kiln, why not let Vulcan give you some suggestions and preliminary drawings for your consideration.

"THE OLDEST NAME IN ROTARY KILNS"

VULCAN IRON WORKS, INC.

Member: National Limestone Institute, Inc.

WILKES BARRE PA

CABLE ADDRESS: VIIIWORKS

ROTARY KILNS, COOLERS, DRYERS, RETORTS, CALCINERS, VERTICAL LIME KILNS, BRIQUETTING PRESSES, ELECTRIC HOISTS, SHEAVES, SUGAR MILLS, EDGE RUNNERS

Enter 1460 on Reader Card

Slurries...handled at lower cost

The new WILFLEY MODEL & Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement elurry and results in stepped-up production and substantial power savings. Individual engineering, Witte itor details.

A. R. WILFLEY and SONS, Inc. Denver, Colo., U.S.A.





Enter 1461 on Reader Card

FOR REPAIRS?

The money you are paying to keep worn-out equipment working may be just enough for you to own better equipment.

See the "WHERE TO BUY" Section

New Machinery

continued from page 142

Air hose

Maximair is the name of a new hose for compressed air developed to perform under some of the toughtest operating conditions in the rock products industry. The new hose is said to be capable of maintaining working pressures higher than any other hose in the maker's line. Pressures up to 400 psi. are possible in some sizes.

New compounds and new hose-making techniques have been combined to achieve maximum flexibility and toughness. The carcass is of double-braided high-tensile rayon and it is protected with an abrasion-resistant Neoprene cover. Up to 2-in. sizes are available in 25, 50 and 75-ft. lengths. (Dayton Industrial Products Co., 2001 Janice Ave., Melrose Park. Ill.)

Enter 322 on Reader Card

Exhaust gas scrubber

Impinjet is the name of a new line of gas scrubbers said to provide high efficiency with low operating cost. Single and multiple impingement plates are available to assure high dust collection effectiveness under a wide range of dust loadings and operating conditions.

Pressure drop and power needs are low. Liquid consumption is about 1 to 3 gal. per 1,000 cfm. of dust-laden gas at 20 to 40 psig. A single-stage unit may have a pressure drop as low as $2\frac{1}{2}$ in. The new line will have its most important application handling the hot, dust-laden exhaust gases from cement kilns, lime kilns and gypsum kettles when exceptional dust collection efficiency is imperative. (The W. W. Sly Manufacturing Co., 4700 Train Ave., Cleveland 1, Ohio)

Enter 323 on Reader Card

Coarse aggregate scrubber

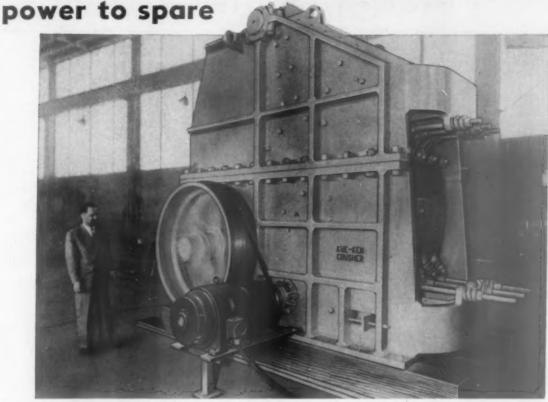
Coarse aggregates can be effectively scrubbed with a newly developed log washer. Continual scrubbing action is provided by spirally placed paddles that mesh together in sequence without load shocks or power peaks. As a result, scrubbing action is improved with lower power requirements.

Other features of the new washer are two-piece replaceable paddles, a self-supporting tank with large clean-out doors and externally mounted lower bearings. The new design is available in 24 and 30-ft. long units with both 36 and 48-in. diam. paddle assemblies. (WEMCO Div., Western Machinery Co., 650 Fifth St., San Francisco 7, Calif.)

Enter 324 on Reader Card

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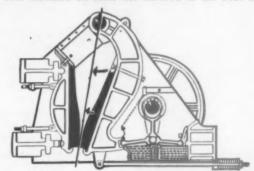
KUE-KEN® crushes at higher speeds with



Kue-Ken has greater capacity for its size than any other crusher. With a highly efficient lubrication system, Kue-Ken operates at higher speeds and crushes more tons per hour on substantially less power. In shop test, the 48" x 42" Kue-Ken above is started by a 30 hp motor with a single vee belt and runs mounted on skids not fastened to the floor at

the operating speed of 275 rpm on only 17 hp. With a pendulum type swing jaw, Kue-Ken eliminates power waste inevitable with conventional crushers that require the lifting of heavy, unbalanced jaws. Operating on the patented "crushing without rubbing" principle, Kue-Ken utilizes power to crush rock and not to wear out jaw plates.

Driven by toggles that multiply leverage 3 to 1, Kue-Ken swing jaw has maximum leverage at top where large rocks are crushed with less power. The precision machined toggle mechanism operates in a sealed, filtered oil bath to reduce wear and friction to the absolute minimum. Power that is wasted in non-sealed, dirtcatching mechanisms is fully utilized by Kue-Ken in crushing rock. Kue-Ken operates with a single lightweight flywheel that is easily started with a normal duty squirrel cage motor. An automatic, adjustable safety release integral with the flywheel ends shearing or breaking parts caused by tramp iron. In 33 sizes from 12" x 7' to 48" x 48", Kue-Ken Crusher crushes more rock with less power for lowest cost-per-ton crushing.



Kue-Ken "crushing without rubbing" lengthens law plate life at least 5 times! The pendulum type law supported on a stationary hinge pin in center line of the crushing zone swings in an almost straight line to crush rocks squarely without rubbing.

KUE-KEN® CRUSHERS STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

"CRUSHING without rubbing"

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables VIbrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.

Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

SEATTLE, WASH., Washington Machinery Co. * VANCOUVER, B. C., Universal Equipment Co. * SALT LAKE CITY, UTAM, Lund Machinery Co. * SAN ANTONIO, TEX., Closner Equipment Co. * LOS ANGELES, CALIF., Garlinghouse, Freman Co. * SAN FRANCISCO, CALIF., Aggregate Engineers, Inc. . PORTLAND, OREGON, Air-Mac, Inc. of Oregon . BISMARCK, NORTH DAKOTA, Midwest Equipment Co.

Enter 1473 on Reader Card

MANUFACTURERS NEWS



Gossard succeeds Lindsay

Upon the recent retirement of Kenneth Lindsay, executive vice president of Iowa Mfg. Co., A. C. Gossard was appointed by President Howard Hall to succeed Mr. Lindsay in the responsibilities of directing all domestic sales and advertising for the company. After attending Coe College in Cedar Rapids, Mr. Gossard was employed by Iowa Mfg. Co. in 1925. In 1931 he was named assistant sales manager for the firm, and in 1954 he was elected vice president and domestic sales manager.

How elected to McKee board

Jack H. How, president of Western Machinery Co., San Francisco, Calif., has been elected to the board of directors of Arthur G. McKee & Co., Cleveland, Ohio. Western Machinery Co. became a wholly owned subsidiary of McKee in January, 1961.

Reconditioning and cleaning service for dust filter tubes

The Day Sales Co., Minneapolis, Minn., has announced a new service for cleaning, repairing and reconditioning filter tubes and sleeves used in the filter-type dust collectors. Tubes of all types, sizes and materials can be handled. This total service includes: removing tape and stitching, vacuum cleaning, dry cleaning, inspecting the filter sleeves for quality and size, splicing in new material (if required) to return tube to proper size and adding new tape and stitching. The service restores the original porosity of the cloth or felt tubes.

McNally Pittsburg acquires Kennedy Van Saun

Mr. Byron H. Pyle, president of the Kennedy Van Saun Mfg. & Engr. Co., New York, has announced that controlling interest in the firm has passed to the McNally Pittsburg Mfg. Co. McNally purchased the stock held by Mr. Pyle and surviving members of the family of the late Mr. Joseph E. Kennedy, founder of the firm. The cash transaction did not involve an exchange of stock nor outside financing.

Upon the retirement of Mr. Pyle, Maurice Shafer, presently executive vice president, will become president of the firm. Edward T. McNally, president of McNally Pittsburg Mfg. Corp., will become chairman of the board of directors of the Ken-

nedy firm. Other officers in the firm will continue in their present posts. Sales and engineering activities in New York and manufacturing in Danville, Pa., will be continued.

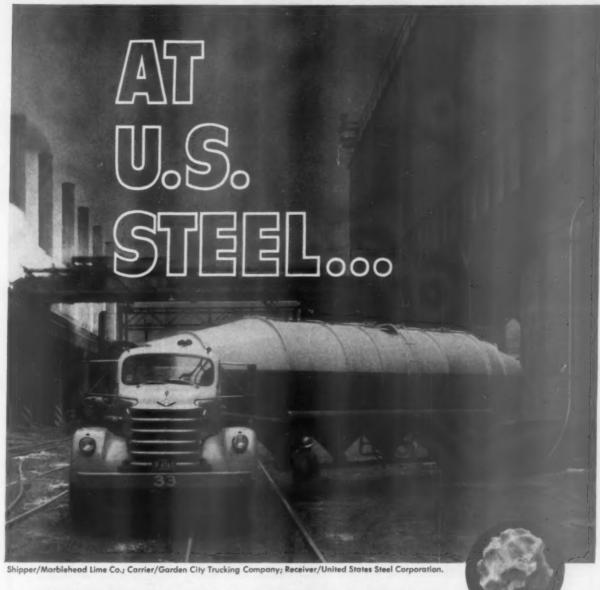
Three-way dump bucket



The Libu Shovel Co. AB, Stockholm, has now concluded that its bucket, introduced some years ago, has been sufficiently tested in long time practical use and that the time has come to let the bucket go into large scale production. This bucket is for digging and loading all kinds of material, based on the three-way dump bucket for tractor loaders.

Manufacturing in large series will also start in Australia in 1961. Affiliated sales companies in New York and Los Angeles started during 1960. The bucket was originally manufactured only for track-type tractor loaders, but is now also being made for the Caterpillar wheel loaders. Photo shows the $2\frac{1}{2}$ -cu. yd. capacity general purpose bucket which has a rated production of 60 min. hr. of 235 cubic yards loose material.

Please turn to page148



7/8" PEBBLED LIME...DELIVERED ON TIME...

Fast, low-cost bulk trailer delivery is helping many producers of mineral and other rock products develop new, profitable business opportunities in the chemical, steel and construction industries. And Butler pneumatic delivery trailers are successfully delivering products ranging from the finest talc-like pulverants to coarse granulars.

For full details contact your carrier. Or write for free brochure, "A New and Better Way to Move Dry Flowables."



BUTLER MANUFACTURING COMPANY

7562 East 13th Street, Kansas City 26, Missouri • 1062 Sixth Ave., S.E., Minneapolis 14, Minnesota

Manufacturers of Equipment for Transportation, Bulk Storage, Farming, Outdoor Advertising • Metal Buildings • Plastic Panels • Contract Manufacturing Factories at Kansas City, Mo. • Minneapolis, Minn. • Galesburg, Ill. • Richmond, Calif. • Birmingham, Ala. • Houston, Tex. • Burlington, Ontario, Canada

Enter 1464 on Reader Card

Manufacturers News

continued from page 146



45-year veterans

A special executive banquet and presentation of watches recently commemorated 45-year service anniversaries for two departmental supervisors of Harnischfeger Corp., Milwaukee, Wis. President Henry Harnischfeger (center) congratulates the two men: Walter Meitner, repair costs supervisor (left), and John Farley, supervisor of the central engineering division. The only other 45-year veteran is Walter Harnischfeger, chairman of the board for the 76-year-old firm.

Three new appointments at Kaiser Industries

The appointments of John L. Hallett and Louis H. Oppenheim as vice presidents of Kaiser Industries Corp. and of Franklin T. Matthias as vice president of Henry J. Kaiser Co. were announced by Edgar F. Kaiser, president of both firms.

Mr. Hallett is general manager of Kaiser Engineers International, a division of the Henry J. Kaiser Co. of which he is also a vice president. He joined the Kaiser organization in 1938. Mr. Oppenheim is general manager of Kaiser Engineers and a vice president of Henry J. Kaiser Co. He has been with the organization since 1938. Mr. Matthias is manager of heavy construction for Kaiser Engineers. Before joining the organization earlier this year, he was chief engineer

and director of engineering and construction, Aluminum Co. of Canada, Ltd.

New managers appointed

Howard W. Lange has been promoted to manager of the western territory of Western Precipitation Div. of Joy Mfg. Co. with headquarters in San Francisco. Mr. Lange has served in the West for the company for many years and is well acquainted with industry throughout the area.

Named manager for the Midwest territory was Eugene F. Sherr. With 15 years service in the Chicago office, Mr. Sherr is well known in industry throughout the Midwest. He will be in charge of all operations for dust and fume control equipment.

END

RP 2	> BUYE	RESEA	PCH	SERV	ICE <
		RCE CONTACTS FOR Reinery—Equipment—Sup	OCK PRODUCT		REE
Aftercoelers, Air Agitators Agiregates (special) Air Compressors Asphalt Mixing Plants Bagging Mathines Bags Barges Belting, Conveyor Elevator, Power Transmission Belting, V-type Belt Repair Equipment Bin Level Indicators Bins and Batching Equipment Bits Blasting Supplies Bodies, Trailer	Buckers Bulldozers Cors, Industrial Classifiers Clutches Coal Pulverizing Equipment Concentrating Tables Conveyors Crushers Coalers Cranes Derricks Dewatering Equipment Sand Diesel Engines Draglines Draglines Draglines Draglines Draglines Draglines Draglines Draglines	Drilling Accessories Drills Dryers Dump Bodies Dust Collecting Equipment & Supplies Electric Motors Engineering Service Consulting and Designing Explosives & Dynamin Funs and Blawers Feeders Fifth Wheel Heavy Duty Special Flotation Equipment Frant End Loaders Gasoline Engines Gear Reducers Generator Sets	Mard Surf Materials Hoists Hoppers Kilns: Rote Vertical Locomotiv Lubricants	lant Machinery acing ary, Shaft, es Separators oth	Shovels, Power Speed Reducers Tanks, Storage Tires and Tubes Torque Convertors Tractor Shovels Tractors Tractors Traiter Dump Bodies Trucks, Bulk Cement Trucks, Bulk Cement Trucks, Motor Trucks, Motor Valves Vibrators Welding and Cutting Equipment Winches Wire Cloth Wire Rope
principal rock product(s) my is/are indicated "i" " ce below. Crushed Stone Sond & Gravel Slog Cement Lime Gypsum Labove information is strict	Ready Mix Concrete Concrete Products Type Other nonmetallic mineral (Whet?) city confidential to be used a supplying preper informa- ervice Desired Ilterature only	NOTE: See—Where to Buy-Classified Adver- tising Section for used equipment and com- plete plant informa- tion	Name Fittle Firm Street & No. City and State Your Signature		Title



LOADS LIME ROCK WITH LORAIN LOADER

ML-309 Moto-Loader, with 3-yd. bucket, digs and loads up to 3,000 tons a day

Even with travel distances of up to 150 ft. from bank to hopper, this Lorain ML-309 Moto-Loader digs, hauls and loads the primary crusher with as much as 3,000 tons of shot lime rock in a 10-hour day. It is working in the quarry of the R. J. Jager Gravel Company, St. Paul Park, Minnesota.

It is on steady-producing, rock-hard jobs like this, that the ML-309 proves that the right machine was selected. Balanced power, balanced weight and balanced controls provide fast, high-production cycles. Ranges that can't be beat in its size give reach and dump height to handle the big jobs. And exclusive design features give sturdy reliability for long-time, low-cost performance.

Here are some features:

One-foot control of forward and reverse travel and speed. Leaves both hands free for steering and other controls.

S-shaped, "safety" lift arms. Their shape provides the ranges... and they are safer because the bottom edge never goes higher than the cockpit sides. 4-speed, full-power-shift "Moto-Matic" transmission. Always the speed range you want when you want it, without stopping. Fewer parts, easier to service.

One-piece, welded-panel frame. A heavy, torsion-resistant structure. Keeps everything in alignment.

Do you want to know more? Ask your nearby Lorain Moto-Loader distributor. He has all the answers—and can arrange a demonstration on any basis you like. If you'll try it, you'll buy it.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN

DOES MORE FASTER • FOR LESS

Enter 1469 on Reader Card

WHERE TO BUY

You may find just what you're looking for in the used equipment, employment and professional advertisements below. Box numbers are confidential and advertisers' names will not be disclosed. Send replies to: Box Number (shown on ad), c/o Rock Products, 79 W. Monroe St., Chicago 3, Ill. All replies will be forwarded to advertisers daily.

ROT. DRYERS-KILNS

10' x 11' x 175' Vulcon Kiln, 18'' 10' x 78' National dryers, %'' 8'-8" x 70' Hardinge %'' welded. 8'-8" x 70' Hardinge %" welded.
8' x 80' Traylor dryer, %" welded.
8' x 60' rotary kiln, ½" welded.
8' x 60' Davenport, T₈" welded.
8' x 40' Stearns-Roger dryers, ½"
7'-6" x 62' kiln, ½" welded.
7' x 120' Allis-Chalmers rot. kiln.
7' x 110' Bonnot kilns, %" shell.
7' x 54' Yulcan dryers, ½" shell.
6' x 7' x 100' kiln, ½" shell.
6' x 50' Leuisville steam-tube. 6' x 50' Leuisville steam-tube 6' x 50' ret. dryer, ½". 6' x 40' ret. cooler, ½" 6' x 25' Leuisville steam-tube 4'-9" x 32' dryers, ¾" shell 4'-6" x 40' Ruggles-Coles dryer 3' x 23' Standard dryer, ¼"

BUY AT LOCATION! Allis-Chalmers 5' x 5' contin. ball mill, diaphram discharge, 75 HP motor-drive.

PERRY

ROCK **PRODUCTS** EQPT. DIV.

8' x 60' x ½" Welded Rotary Kiln 6' x 120' x ½" Vulcan Rotary Kiln 4' x 35' Rotary Dryer New Shell 4' x 47' x & Mosser Rotary Dryer 4' x 35' Rotary Dryer New Shell
4' x 47' x ½" Mosser Rotary Dryer
6' x 25'; 6' x 50' Louisville Rotary Dryers
8'8" x 70' Ruggles Cole Dryer
8' x 11' Traylor Ball Mill Steel Lined
7' x 24' Allis-Chalmers Tube Mill
#5060 Dixie Mogul Hammermill
SX13 Penna. Hammermills, 400 HP SX13 Penno. Hommermills, 400 HP
Heil Potterson Crushers, 100 HP
Raymond #50 & #40 Impact Mills
36" x 42" Koppers 2 Roll Crushers
36" x 48"; 20" x 6" Jaw Crushers
3'x3'x12' Horix.; 4'x9'x12' Vert. Puggers
27" x 24" Komarek-Greaves Brig. Presses
20"x40";30"x96";40"x84";60"x84"Screens
535"—24" Troughing Belt Conveyor
Bucket Elevators 45' to 90' Centers Bucket Elevators 45' to 90' Centers Sweco Separator 48" 3—SS Screens

WRITE-WIRE-PHONE

HEAT & POWER (6) 60 E. 42 St. New York 17, N.Y. MU 7-5280

PERRY FOR KILNS - DRYERS - MILLS

BALL & ROD MILLS

Hardings 8' x 48" conical pebble, 75 HP
Hardings 7' x 36" conical pebble
Hardings 6' x 36" conical bal mill.
Allis-Chalmers 6' x 18' pebble-tube
Allis-Chalmers 6' x 16' ball-tube
Allis-Chalmers 5' x 22' ball-tube
Allis-Chalmers 5' x 5' ball, 75 HP

Report A' x 10' conical ball for HP Denver 4' x 10' rod mill, 60 HP.

CRUSHERS—PULVERIZERS

Allis-Ch. #322 hydracone crusher.
Farrel 36" x 15" jaw crusher
Buchanen 24" x 13" jaw, 50 HP
Farrel 20" x 6" jaw, 30 HP
Mitchell 18" x 9" jaw, 25 HP
Babcock & Wilcox #32E ball type pulv.
Raymond 56" 6-roller mill, 200 HP
Raymond 50", 5-roller, hi-side mill
Dixie #5060 hammermill, 500 HP

EQUIPMENT CORP. 1418 N. Sixth-Phila. Pa. Phone POplar 3-3505

ELEC. AIR COMPRESSORS
695' Chgo. Pnew YCB-100 HP 220/440 V.
6—Inger Rond, 1350, 2200, 3000 & 3800'
DIESEL LOCOMOTIVES, CRANES & CARS
18—115, 100, 80, 70, 65, 45, 25, 20, 10 & 8
ton GE & GM & Plymouth Diesel Locometives
500—50 & 70 ton 00 fondolo & Box Cars
500—50 & 70 ton Ore Cars
25 ton Amer. Diesel Loco Crone
40—20 & 30 yd Air Dump Cars
ROTARY DRYERS & KILNS
6' x 48', 6' x 72', 8' x 60', 9' x 160', 10' x 78'
8' x 125' Rotary Kilns
12', 3' 4', 51/2' & 7' x 19' ynons Cones
REDUCTION MILLS & FEEDERS, SCREENS
18V-Pioneer Portable Diesel Crusher
40 x 33 Cedar Raputs Hammermill
2020 & 3645 Double Impact Breakers
15 x 24 Cedar Rapids Hammermill
2020 & 3645 Double Impact Breakers
15 x 24 Cedar Rapids Hill w/motor
5' x 5' & 6' x 4' CIW Ball Mill w/motor
5' x 5' & 6' x 4' CIW Ball Mill all Swept
4' 0' Traylor Trype Tr-Covatorv
10" x 30", 18" x 36", 13" x 24" Jaw Crushers.
4", 20" Traylor Finnary Gyratory Crushers
2—20" Allis-Chalmers S.McC. Gyratory Crushers
24" x 14" Allis Chalmers S.McC. Gyratory Crushers
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20"	25'	871	19.30	998	109.45	1150	123.81
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224C	2' x 4'	2	519
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126C	2' x 6'	1	519
226C	2' x 6'	2	551
326C	2' x 6'	3	660
136C	3' x 6'	1	639
226C	3' x 6'	2	757
336C	3' x 6'	3	1052
138C	8' x 8'	1	743
238C	8' x 8'	2	897
338C	8' x 8'	3	1006
136TB	3' x 6'	1	1243
236TB	8' x 6'	2	1316
236TH	3' x 6'	3	1393
138TB	8' x 8'	1	1299
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18"	3	18" x 12" 2.88	
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16"	4	1/8" x 1/2" 3.21	
18"	4	3/8" x 52" 3.86	
20"	4	1/8" x 31" 4.11	
24"	4	1/8" x 1/2" 4.61	
30"	4	16" x 15" 5.83	
36"	-4	16" X 19" 6.89	

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16"	4	3.74	3.36
18"	4	4.14	3.73
20"	4	4.72	4.02
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